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Vol 4 No 11

Commodore and Acorn prices tumble in shops

THE price cut on Commodore's Plus/4 computer from £299 99 to £149 99 (see *Popular Computing Weekly* February 14) has led many retailers to cut the price of its other machines in the stores, as the price cutting war on hardware continues

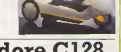
Dixon's led the way, by cutting the £130 C16 down to £79 95 Boots has followed suit, and W H Smith has responded by further reducing the C16 to £69 95

"Our price cut on the C16 was made to keep the Commodore products in line with each other" said Dave Gilbert of Dixon's "After the Plus/4 went down, Boots dropped the Commodore 64 to £149 which we followed At £79 95, the C16 suddenly started moving very fast. The cut on the Plus/4 means that it is selling well too now it was a bit disappointing before "

Peter Frost of Boots, how-

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Win a C5 see p6



Commodore C128 — two versions

COMMODORE's new C128 micro is to be sold in this country in two different versions

The basic C128 – shown for the first time in Chicago in January – will be a direct successor to the Commodore 64, while the second version, the C128D, will have a single disc drive built-in

The C128D will comprise two units – the processor unit plus disc drive together, and a separate keyboard The processor unit is designed so that a monitor can sit on top Apart from the disc drive and difference in appearance the machines are identical in operation. It is believed that the basic C128 will be manufactured in Corby, and the C128D in Hanover

However there is some confusion within Commodore as to when the 128D will be launched

David Gerrard, Commodore UK's marketing manager, said, "The C128 will be launched in the second half of the year – as far as I know, there is only one version to be launched at the moment "

But Gail Wellington who heads Commodore's software acquisition throughout Europe said, "The two versions should be launched simultaneously – or, if not simultaneously, then the built-in disc drive version will follow very shortly "

Commodore is also planning to produce software on a single disc that will run for all four of its machines the C16, Plus/4, C64 and C128

The different versions of the program will be headed by a specific loading routine to tell the computer which machine the program is run

continued on page 4 ▶

The C128D – photograph courtesy of Tony Sleep and Microscope magazine

BUILD THIS ROBOT

for only £12.95 see p14



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View

Looking at machines like Commodore's C128D and Amiga or Atari's ST it is obvious that here you have a couple of traditionally home computer manufacturers looking to expand their horisons

Reading their press handouts it seems they are hoping to magically expose a huge new – and as yet untapped – market for a home computer that is capable of serious application. The argument goes that people have finished playing games and are now to get down to the serious business of running a business, word processing letters, organising accounts

And, the best of luck to them. The ST, particularly, is a bold and exciting micro

Yet they are by no means the first company to embark on this 'quest'. Sinclair, for example, said much the same sort of things about the QL when it was launched. The QL has undoubtedly found a market – but is it a huge one?

Going back even further, Camputers intended its Lynx machine – offering CP/M – to have been a serious micro at a home micro price

We will have to wait and see if Commodore or Atari (or even Sinclair or Amstrad) can crack it, but it is interesting to reflect that all the companies who have shown themselves to be interested in this 'middle ground' market are ones traditionally associated with the games scene

When will the business micro companies like ACT and Apple launch a micro into the £400-£600 range?

Both have gone some way there with the Macintosh and the Apricot F1, respectively

If ACT, say, was to launch a *really* low cost business system it would be fascinating to see how it compared with Atari's ST or the C128

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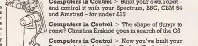
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Computer Trade Association Magazine of the Year

Acorn's shares re-open on USM

TRADING in Acorn Computer's shares on the Unlisted Securities Market began again on March 6 last week, as it was revealed that Acorn's debts top £40m

The shares, which were suspended on February 6, re-opened at 28p, went up to 32p during the course of the day, and then fell back to close at 28p again. Late last week they had dropped 3p to 25p

Details of Acorn's disastrous interim financial results for the six months ending December 30, 1984 were also published last week

They confirm Acorn's post tax loss of £10 9m – resulting primarily from Acorn's costly failure and withdrawal from the US and Germany – but also show the value of Acorn's debts to creditors

The company owes a total of £31 1m and its major creditors, Race Electronics, BSR(UK), Wong's Electronics and AB Electronics, are all to be paid in instalments over the next year.

Commodore C128

◄ continued from page 1

ning on, and which part of the data on disc to subsequently load," said Gail.

"This will be beneficial to the retailer, who will only need to stock one disc for all the Commodore machines "

Gail Wellington

The C128 is already beginning to attract software support Audiogenic recently spent a week at Commodore's Slough offices converting its 64 *Micro Swift Spreadsheet* for the C128

"The conversion takes full advantage of the greater space on the 128," said Audiogenic's Henry Smithson. "It gives a worksheet size of 64 columns and 999 rows We believe that the 128 should be ready in a couple of months or so, and our spreadsheet will obviously be available at launch "

Other software already signed up for the C128 is Thorn EMI's Perfect Software series, and Precision's *Superscript* and *Superbase*

Sinclair offers free QLub membership

MEMBERSHIP of Sinclair's QLub – the user's bureau for QL owners – has now been made free

Previously, QL users wishing to join QLub had to pay a £35 annual subscription.

"The free membership is planned to last indefinitely, rather than being for the first year, or anything," said a Sinclair spokesman. "The membership now stands at over 10,000 and this is an enhancement to the service "

All QLub members who paid £35 to join should by now have received the upgraded versions of Psion's bundled QL software – *Quill, Archive, Easel* and *Abacus* New QLub owners, joining fee, will have to pay for the up-grade

● Sir Clive Sinclair has written a letter to France's Prime Minister, M Laurent Fabius, requesting that Sinclair products be taken into account

Sir Clive – wrote to Prime Minister

when the French schools micro contracts are finalised. "At the moment, Bull and Thomson have won a big slice of the contract, but they don't cover all micros, and there are still some gaps to fill, particularly at the low-cost end of the market," said a Sinclair spokeswoman. Sinclair claims to be one of the market leaders in France with the ZX Spectrum, with a 23% share

The Dragon returns to UK

THE DRAGON 64 machine looks set to make a reappearance in this country, following the appointment of Compusense as exclusive Dragon distributors for the UK.

"Our plan is to market the Dragon 64 plus disc drives as a low-cost entry machine for business use," said Ted Oprychal, who heads Compusense.

"We will be selling the 64 at £195 by mail order, and the single disc drive will be priced at £249 We will also be selling the machine, together with a twin disc drive, as a package at around £600. Then we will be offering software on the Flex and OS9 operating systems as well "

Compusense has just taken delivery of its first 100 Dragon 64s and disc drives and it hopes demand will enable it to sell around 50 per month The company is being fully supported by Eurohard SA, the Spanish manufacturers of Dragon machines, who bought up the name and assets of the failed Dragon Data last year

In Spain, the Dragon 64 is the micro currently being heavily promoted into schools Production of the Dragon 32 machine has ceased and Eurohard is planning to repackage the 64 as the Dragon 100 A Dragon 200 – a 128K version, – is planned in the autumn – Details from Compusense, 286d, Green Lanes London N13 5XA

High Street prices tumble

◄ continued from page 1

ever, says it cut the price on the Commodore 64 in response to a similar reduction by British Home Stores "The 64 was made to look a bad buy at £199 when the Plus/4 was cut Then BHS bought the 64 down to £149 and we followed them," he said. "The price on the C16 now seems to have been set by Dixon's at £79 95 I think we would have preferred it at £99 "

Commodore UK's marketing manager David Garrard remains unmoved by the High Street's cuts "Commodore is not taking any further steps on pricing," he said. "The trade has taken its own actions, and we can see no reason for it – I don't think their stocks are large enough to warrant it."

Commodore is not the only manufacturer hit by retail price cutting The BBC B machine is also widely available at well below its recommended price of £399 and most of the large High Street retailers have preferred to cut £50 off the manufacturer's price, rather than join in Chris Curry's £50 trade-in scheme (see *Popular Computing Weekly*, 31 January)

At Boots, you can buy a BBC B with a data recorder for £328 The same package at Dixon's costs £349 99 At W H Smith, the basic BBC model is £339 Most are selling the BBC bundled with a disc interface at £399

However, Acorn and Sinclair's own cuts on the Electron and Spectrum + respectively to £129 each seem to have done the trick "There was substantially improved demand at a stroke," said Dave Gilbert, while Peter Frost commented, "The decrease stimulated demand which is now settling down at a higher level than before."

Beyond with new label

BEYOND has announced details of a new arcade shoot-'em-up, *Quake* – but it may not be released under the Beyond label.

Quake is being programmed by Warren Ffoulkes and Mike Singleton, and will feature the landscaping technique Mike pioneered for the *Midnight* trilogy

According to Mike, the game is set in a power station on the bottom of the Pacific Ocean which is tapping the Earth's core Terrorists of the Robot Liberation Front have programmed five of the base's six defence computers

continued on page 5 ►

US Gold action

US GOLD has continued its legal action against GB Gold, (see *Popular Computing Weekly*, March 7) on the grounds that GB Gold were passing off US Gold's name, logo and emblem.

At a preliminary court hearing held last week, Vanguard Leisure – the company behind GB Gold – were prevented from manufacturing, selling or advertising any product with the GB Gold name, pending a full court hearing into the dispute.

"We had five sworn affadavits from companies such as distributors to say that the similarity in names was confusing and misleading," said Tim Chaney of US Gold.

US Gold previously won a dispute with Knightsoft which introduced a UK Gold series of software. US Gold had registered both the names UK Gold and also Euro Gold. That time the dispute was settled out of court.

◀ continued from page 4

to go into Quake-mode in 24 hours, and destroy the world.

Quake will be launched in September for the Commodore 64, at £9.95.

It may not be released as a Beyond game at all however. Instead it may come out under a new label being created by Beyond specifically to handle arcade games.

Clive Bailey, the company's marketing manager, suggested that the move was to avoid confusion in the marketplace.

"It is confusing to players to find adventure/strategy games under the same label as arcade games, so Beyond will continue to publish state of the art adventure and strategy games while the new label releases state of the art arcade games."

Apparently a number of names have been considered for the new label, including Blitz, Monolith and Magic, but all have been rejected as "unexciting".

Whatever the new label ends up being called, it will be launched in June.

Prism Movits still available

THE MOVIT range of robot kits, previously distributed by Prism, are now available in this country from Middlesex company, Commotion.

Apart from four of the original five Movits, four new robots will be made available.

"*Peppy* and *Medusa*, which is a sort of walking tripod, are both sound activated, *Avoider* is an infra-red sensor, which will move away from heat, so if you put your hand in front of it, it'll turn round, and *Navius* is programmable by the user for a number of different movements," said Timothy Coote, managing director of Commotion.

Piper Mouse

Peppy is the cheapest of the new range at £16.95, *Medusa* is £18.95, while *Avoider* and *Navius* are both £29.95. Of the five original Movits (*Line Tracer*, *Piper Mouse*, *Monkey*, *Circular* and *Memocon Crawler*), the *Memocon Crawler* is no longer available. Details from Commotion, 241, Green St, Enfield, Middlesex.

New titles from Imagine

THE IMAGINE name has resurfaced on two new titles just released by Ocean.

Ocean bought the rights to Imagine's name in the wake of Imagine's collapse last summer.

The titles available are *World Series Baseball*, a graphic simulation for the Commodore 64 and Spectrum at £7.95 and *Wizadore*, an adventure, for the BBC at £9.95.

World Series Baseball was one product taken to the US by Imagine last summer in an attempt to attract sales over there before the company crashed.

Letters

Elitist attitude

Many of us have read with dismay of the recent plight of Acorn.

Even so, one can't help but say that it brought its problems upon itself with its pricing policy

Initially the BBC micro was the Rolls-Royce of the industry with a price tag to match. Even if you could afford one you still had to face huge prices for peripherals. I own a Spectrum, but would be the first to admit I would have liked a BBC if it had not been for the price

Yet, as other manufacturers have either dramatically reduced costs and/or introduced more advanced models — particularly with more memory – the BBC still remains at its original price with a memory size which now, compared with others, is very restricted (especially in graphics mode).

If Acorn had not had the added bonus of the BBC name one can only assume the company would have folded up long ago Even many Spectrum programs, when converted for the BBC, had to have restrictions in content or number of screens just to run on it!

As for the Electron, this was a disaster from start to finish, gaining whatever reputation it has on the back of the BBC machine

With a more realistic pricing policy Acorn had the opportunity to capture the major share of the home micro market – yet with Acorn's apparently elitist attitude that chance was thrown away.

Robin Window
18 Easthams Road
Crewkerne
Somerset

Poor Investment

Robert Sedgewick should think twice, (letters, February 21) Today's radios, calculators and especially computers will never become collectors' items if we all do what he suggests (ie, hang on to them) because they will never become rare enough to make them valuable to collectors

So when Robert Sedgewick's house becomes full of the junk he bought for 'practically nothing', he'll feel such a nerd selling it again for hardly anything at all.

Julian Skidmore
25 Cossall Road
Trowell
Notts

That's not the way we do things here

Green ripple

After purchasing an Amstrad CPC464 with a green screen monitor, I noticed that a 'ripple' travelled down the screen every couple of seconds Returning to the shop I noticed that all the green screen Amstrads had the same fault

The retailer couldn't help me so I contacted Amstrad. At first they denied the existence of any fault on the green screen model blaming the ripple on 'fluorescent lights' and 'variation of mains supply' Eventually after two days and three long distance telephone calls the service manager for Amstrad admitted a modification kit existed – and my monitor is now perfect!

What angered and disappointed me, though, were Amstrads's initial emphatic denials It was precisely this sort of attitude which led to the downfall of the British motorcycle industry and the near collapse of BL.

Lawrence Dolan
230 Selsey Road
Edgebaston
Birmingham

Competition

Win a Sinclair C5

How would you like your own C5 electric vehicle – to drive to the shops, to the station, to school, college or work?



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All you have to do is submit a design for the electric car you would like to see Sinclair Vehicles launch for you in the 1990s Send us your drawing/sketch/masterpiece and a few short explanatory notes

It doesn't matter if you can't draw very well – we are more interested in the general look and ideas behind your car of the future The winner will be the person who sends in the most imaginative and exciting vision of Sinclair's transport of the future.

The competition will be judged by a panel from *Popular Computer Weekly* and Sinclair Vehicles, and their decision is final. All entries must reach us by 12.00pm, Thursday April 4th, together with the coupon from this page.

Send your entry to *Popular Computing Weekly*, C5 Competition, 12-13 Little Newport Street, London WC2H 7PP Employees of Sunshine Publications and Sinclair Vehicles Ltd and their families are not eligible to enter.

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Yours faithfully,

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MACMILLAN SOFTWARE

Ring quest

Program *Ring of Darkness* **Price** £9.95 **Micro** CPC 464 **Supplier** Wintersoft Software, 30 Uplands Park Road, Enfield, Middx EN2 7PT

One of this rare breed of programs that were so good on the Dragon that they had to be converted on to other machines, *Ring of Darkness* is often classed as an 'adventure' but, despite a degree of text input and output, it in fact owes more to role playing computer games such as *Wumpus* and *The Valley*.

As in Dungeons and Dragons you build up a character with amounts of intelligence, strength and agility and choose a suitable race and role such as 'elf-thief'. You must then cross the land, gaining experience as you are set upon by thugs and complete many minor tasks set you by any Kings you bump into. Along the way you come across hints that there is in fact a much greater quest, involving said ring, to be completed but getting anywhere with this will involve many hours of play.

Movement is represented on screen by simple non-animated graphics which travel in character-square sized jumps over a plan view of the countryside. For once, however, this is excusable because every spare byte of memory has been used in creating the large playing area and complex plot. Occasionally, preferably when you have accumulated a lot of experience and power, you can venture underground into dungeons which are comprised of graphic mazes and are full of evil things. (If you are contemplating buying a 3D maze game then don't, because those held within *Ring* are amongst the best I have seen and you get much, much more besides.)

Thanks to the use of data compression techniques the 464 game holds all the mazes within the one program – on earlier versions they had to be loaded in off the tape which was irritating if you only survived ten seconds. A deservedly popular program that gives a lot for your money.

Tony Kendle

Supercode

Program *Supercode III* **Price** (to come) **Micro** Spectrum 48K **Supplier** C.P. Software (III), 2 Glebe Road, Uxbridge, Middlesex UB8 2RD

Are your programs tired and listless? Do your arcade games lack that certain sparkle? Then you need *Supercode III* with the added ingredient for '85 – operating system 3.5. Let *Supercode III* take the words right out of your mouth – and scroll them every which way in a flash (of attributes) be it writing with 'foreign accents' or in a sci-fi character set. And read other people's headers while they can't even break into your programs!

Resist this enthusiasm, and the variety of off-the-peg routines is still relatively varied; sound, graphics, program compression, protection and manipulation microdrive and interface utilities.

Copyright is waived, even for commercial use, providing *Supercode III* is credited, but don't imagine that this w your passport to millions. You'll still have to provide the writing skill to make best use of these techniques. The ambitious and imaginative programmer will find it a useful toolkit though.

John Minson

Timbers shivered

Program *Booty* **Price** £2.50 **Micro** Spectrum 48K **Supplier** Firebird Software, Wellington House, Upper St Martin's Lane, London WC2H 9DC.

Shiver me timbers and avast behind! I hate this sort of game . . . , as a reviewer that is. It's one am, my deadline looms, and I don't want to stop playing. I know that with just one more go I'll get it right!

After all, it's just a game and a platform game at this, but what a brilliant one. Jim, the cabin boy, has to clear booty from the 20 holds of the Black Galleon. These are partitioned by numbered doors, opened by corresponding keys. Jim can only carry one key at a time and some keys lie behind locked doors.

This causes trouble because several rooms imprison deadly ghost pirates who have to be released and dodged to complete the task. Other wandering nasties add to the chaos, as does booby trapped booty – Jim can just avoid its explosions if he's sharp. There's also a maze element in that the holds are interconnected by various doors, but to use them well calls for careful planning.

A few rough edges show, such as the abrupt return to the title screen on losing Jim's last life, but this is a budget game and playability is high.

No turkey this, though I'll still quote Bernard Matthews – 'It's *Booty*-full!'

John Minson

Q-laughter

Program *The Quest for the BBC Joystick* **Price** £4.95 **Micro** BBC B **Supplier** Delta 4 Software, The Shieling, New Road, Swanmore, Hants SO3 9PE

Ian Willis is a loony! The nicest kind, however, he and Fergus McNeill have produced a light-hearted adventure game that is genuinely witty, fun to play and suitably infuriating.

Your task is to find and assemble parts of a joystick. To do so, you'll travel all over England, get to know more about London's Underground than any sane person would wish, will meet some suspiciously familiar names like The Lame Gords, Picro Mower, Snotball, Castle of Piddles, Harrodth (a well-known thop in Knighthbridge), Chublock Homes and Doctor Ampdaughter and so on. You'll also come to dread loud music in record shops.

The game starts with a stupendous title sequence which must be seen and heard to be believed. In future playings you can skip it and go straight to the adventure. Commands are the usual format with some jokey responses and the only mis-spellings are clearly deliberate. The screen display is a neat and colourful one. Your status and strength can be checked at will and the game can be saved at any point.

A delightful adventure which will bring hours of laughter to any household – and at a bargain price.

Dave & Jan Watterson

Fast puck

Program *Slap Shot* **Price** £8.95 **Micro** Commodore 64/2 joysticks **Supplier** Anirog, 8 High Street, Horley, Surrey

Lots of sport simulations are coming on to the market at the moment, and Anirog is following the trend by releasing *Slap Shot* – an ice hockey simulation. You'll need to find yourself an opponent before you start, but after that, it's straight down to the action.

No sooner have the players selected their favourite international teams, than the display switches to the ice rink. About a quarter of the playing area is shown at any one time, with the action smoothly scrolling up and down the pitch.

You control one player who can skate in a number of directions at varying speeds, and pass or shoot the puck. The other players in the team are controlled by the computer. The goalie can also be moved when you are defending.

Encouraged by the clapping and the whistling of the crowd, each team has to play three action-packed, three-minute periods. The computer also provides the odd speech commentary, like "he scored", or "penalty". It's amazing what computers can do nowadays.

Ice hockey is a very fast tough sport, and *Slap Shot* tries to capture these features. It's a very ambitious game and it comes off quite well although it must be admitted that this game isn't up to the excellent standards of simulations like *International Soccer*.

My only small criticism is that you need to find an opponent before you can play. If you don't fancy the roughness of the real game of ice hockey, then *Slap Shot* can provide a good fireside alternative.

Tom Hussey

QL upgrades

Program *Quill, Abacus, Archive and Easel* **Price** £15 each or £50 for all four **Micro** QL **Supplier** Sinclair Research Limited, Stanhope Road, Camberley, Surrey GU15 3PS

As all QLUB members will now know, the software upgrades from Sinclair are now available and are being sent out free of charge, but for anybody who is not a member of QLUB, Sinclair is going to charge £15 for each package you want to upgrade or £50 for all four.

The first thing you find when loading one of the programs is the speed at which they now load. It now takes only 10 to 15 seconds to load any of the programs. When loaded you find that each program has more memory free for data, the figures are *Archive* – 20K, *Abacus* – 22K, *Easel* – 12K and *Quill* – 4.5K. The extra memory available for Quill means that documents less than 4 pages long don't need to be partially stored on to microdrives while you write them.

The extra memory available in the other programs allows you to enter larger amounts of data.

As well as more space being made available, the programs have been compressed to fit into memory, meaning that no overlays from the microdrives are needed. This is shown when using *Quill* which now does not need to access the microdrive for any of its commands.

The only time the programs need to access microdrives is to load in the 'help' file or the information for the printer.

To make the memory space needed to hold the extra data the programs have been rewritten in machine code, this in turn means that there is a large increase in speed. Examples are the speed at which *Easel* now draws pie-charts (now done in only a few seconds) and the general improvement found when using *Quill*.

While each piece of software comes with a new manual. The main improvement I've found here is the information given on exporting data between programs and using printers.

To allow you to use extra hardware the 'install' programs have been improved so you can use a different output device such as a parallel printer.

However, even though the software is greatly improved over the older versions, it shouldn't now be sold at a profit, the originals simply had too many errors.

Roger Thomas

Music maestro

Program *Music Composer* **Price** £9.95 **Micro** CPC 464 **Supplier** Kuma Computers Ltd., 12 Horseshoe Park, Pangbourne, Berks RG8 7JW

I have some very firm ideas about the sort of facilities that I would like to see in a music composer, nothing ambitious mind you, but almost without exception I have yet to see a program that incorporates them all. Kuma's attempt for the 464 is yet another of this brood of curate's eggs – good in parts.

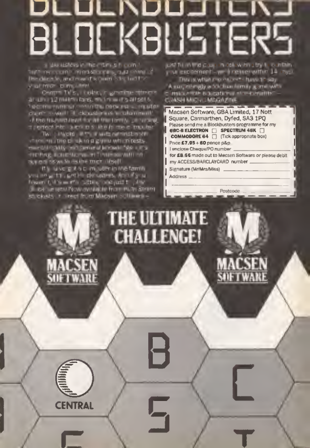
To start with, it is a useful utility for people who not only want to compose music, but also for those who, lacking a musical ear, want to hear how a piece of sheet music should sound. For that reason we should be thankful that it conforms roughly to normal music notation, covers a range of three octaves (although it should have been the seven that the machine is capable of), has a wide choice of keys that can be altered during composition, and allows a large number of notes to be stored in memory (up to 1,000 for a single tune). Entering a note note by note is pretty easy, taking from between 3-5 key presses to specify octave, note and duration, but editing them if you change your mind is a slightly more complicated and slower process.

On the negative side, the program does *not* notate bar endings, etc, and tempo is only set in terms of absolute speed of playing, so it is limited as an educational tool. The smallest note length is a semiquaver and, more regretfully, only one channel of music can be played at once which hampers the scope of the composition.

It should also, but doesn't, allow you to change the voice of the note that plays and ideally the tune should be able to be saved as object code which can be called from your own programs, or at least the appropriate data statements required to recreate it, printed on screen.

Taking everything into consideration, it's not a bad program. Just outrageously priced for its capabilities.

Tony Kendle


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Macsen Software, GBA Limited, 17 Nott Square, Carmarthen, Dyfed, SA3 1PQ
Please send me a Blockbusters programme for my
BBC-B ELECTRON ☐ SPECTRUM 48K ☐
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Price £7.95 + 60 pence p&p
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MACSEN SOFTWARE
THE ULTIMATE CHALLENGE!
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Off your trolley!

Your own robot to build yourself for under £15? ***John Billingsley*** *shows you how*

Fancy building the *Popular Computing Weekly* buggy? Here we show you how to very simply construct a robot for either the Spectrum, Commodore 64, ZX81, or BBC machines – all for around £13

Don't be put off if you think it looks too complicated – all the parts are quite easy to get hold of or if you prefer we can supply you with a kit of parts

It's a small step from adding extra software to your micro to adding a genuine mobile mechanism, but it will completely change your attitude to the possibilities of your machine

The secret is to limit your first experiment to the simplest of interfaces After-wards you will be inspired to go on to build micromice, or even robots with sensors – but start off gently with a simple trolley

Rather than getting involved in complicated reversible motor drives, the *Popular* buggy just switches the left and right motors of the trolley on or off This makes it possible to use an interface consisting of just a single chip for the Commodore, and BBC computers, and just two chips for a Spectrum or ZX81. The trolley is still fairly steerable, although it cannot spin on the spot.

You will be able to teach the trolley a course around the room – or as far as the linking cable will stretch

When you press the *F* key of your computer, the trolley will roll forwards in a straight line Release it and press *L* instead, and the trolley will pivot on the left wheel to turn left Press *R* and the trolley will pivot to the right, press *Space* and it will stop

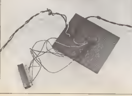
The full program will record in memory the times for which you held down the keys Lift the trolley back to the start and press *G*, and the trolley will set off on the remembered course There is no feed-back or sensing, so the course may be a bit wobbly – but it's a start towards greater things

The trolley

To minimise the work involved in building the trolley, I settled on a gadget sold by Greenweld of Southampton This is made as the innards of a controllable tank, and has two motors with suitable gearboxes and a cunning magnetic clutch arrangement to help it run straight They also sell push-on wheels

To make the trolley, take the motor/gearbox, push on the two wheels And, that's it You can't get much simpler than that!

Of course, that leaves the tail of the trolley scraping along on the floor, and you will probably need to add a tail-wheel or skid That won't change the way it works, however, so I will leave that part entirely up to you



One thing that you ought have to attend to is the cunning magnetic clutch – it can get a bit too cunning for the steering to work. The idea is that a small magnet is mounted on the shaft of each motor, and being close together the magnets will try to lock into line If one motor is a bit more energetic than the other, there would normally be a tendency for the vehicle to go round in large circles Instead the magnets fall in line to drive both wheels at exactly the same speed. If the magnets are too close together, the wheels will lock together To solve this place a thin screwdriver between them through the slot which is conveniently provided, and with two pennies squeeze the ends of the motor shafts towards each other In this way you will press the magnets and their gears more firmly on to the motor shafts and the gap will be increased

Check the clutch by applying a 1 5 volt battery to the wires of just one of the motors That motor should start alone, without carrying the other motor along too

There is still one more task in preparing the trolley, and that is to attach the cable Connect the blue lead of the left motor to the red lead of the right – that is, with the smooth side of the tolley down-wards, and the motors towards you. Connect these to the wire of the connecting cable which we will call 'common' Connect the remaining two major wires each to its own wire of the cable A few inches of sticky tape will serve both to keep the connections separately insulated, and to anchor the end of the cable to the trolley If you are feeling wealthy, you can use three wires-worth of ribbon cable for the lead Instead I recommend that you plait together three lengths of instrument wire, one red, one black and one white Use the red wire as the 'common', black for the left motor wire and white for the right

Now test-drive the trolley under manual control. You will need two ordinary 1.5 volt batteries, wired up in series, giving 3 volts. Connect the red (common) wire to the positive terminal of the pair of batteries, and touch the black and white in turn and both together on to the negative end With both connected the trolley should run straight. You will probably find that to get the trolley to turn, you must first let it stop before driving just one motor

Now, we have to let the computer take over the task of switching the motors.

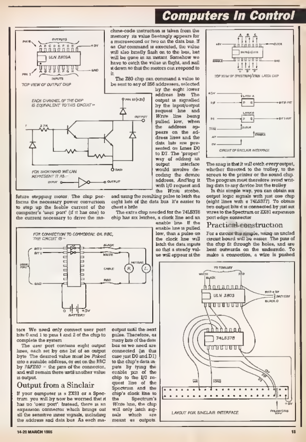
The power chip

The circuit board required only uses one component (two in the case of the Spectrum version) so it is very straight-forward to construct

The ULN2803 chip which is used contains eight Darlington transistors We really only need two of these, but the chip is a really convenient way to obtain them It also gives a lot of scope for future projects

Connect each of the motor leads to an output of the chip, on pins 18 and 17, while the common motor lead is connected to the +3 volt point of the battery This point is also linked to pin 10 of the chip The negative end of the battery is connected to 'system ground', which in this case means pin 9 of the chip which is also connected to the computer's ground

Each of the transistors of the chip is capable of switching 0 5 amps, enough for one of our motors, a relay, or for a



future stepping motor. The chip performs the necessary power conversion to step up the feeble current of the computer's 'user port' (if it has one) to the current necessary to drive the motors. We used only connect user port bits 0 and 1 to pins 1 and 2 of the chip to complete the system.

The user port contains eight output lines, each set by one bit of an output byte. The desired value must be *Poked* into a suitable address, or set on the BBC by *?&FE60 =* the pins of the connector, and will remain there until another value is output.

Output from a Sinclair

If your computer is a ZX81 or a Spectrum, you will by now be worried that it has no 'user port'. Instead, there is an expansion connector which brings out all the sensitive inner signals, including the address and data bus. As each machine-code instruction is taken from the memory, its value fleetingly appears for a microsecond or two on the data bus. If an *Out* command is executed, the value will also briefly flash on to the bus, but will be gone in an instant. Somehow we have to catch the value in flight, and nail it down so that the motors can respond to it.

The Z80 chip can command a value to be sent to any of 256 addresses, selected by the eight lower address bits. The output is signalled by the input/output request line and *Write* line being pulled low, when the address appears on the address lines and the data bits are presented on Lines D0 to D7. The 'proper' way of adding an output interface would involve decoding the device address, *And*'ing it with I/0 request and the *Write* strobe, and using the resulting pulse to latch the eight bits of the data bus. It's easier to cheat a little.

The extra chip needed for the 74LS378 chip has six latches, a clock line and an enable line. If the enable line is pulled low, then a pulse on the clock line will latch the data inputs so that a steady value will appear at the output until the next pulse. Therefore, as many bits of the data bus as we need are connected (in this case just D0 and D1) to the chip's data inputs. By tying the enable pin of the chip to the I/0 request line of the Spectrum and the chip's clock line to the Spectrum's *Write* line, the chip will only latch signals which are meant as outputs.

The snag is that it will catch *every* output, whether directed to the trolley, to the screen, to the printer or the sound chip. The program must therefore avoid writing data to any device but the trolley.

In this simple way, you can obtain six output logic signals with just one chip (eight lines with a 74LS377). To obtain two output bits it is connected by just six wires to the Spectrum or ZX81 expansion port edge connector.

Practical construction

For a circuit this simple, using an unclad circuit board will be easier. The pins of the chip fit through the holes, and are bent outwards on the underside. To make a connection, a wire is pushed

MAKING CONNECTIONS TO THE CHIP

through the adjacent hole and bent over on top of the pin where it is soldered to place. Take care when soldering. Clean the iron before every joint – a quick wipe on a wet tissue will do the trick – and melt fresh solder on to the joint as you solder it. 'Tin' each wire and component before making the joint by melting fresh solder against the iron in contact with that component alone. The result should be a bright film of tin which wets each surface to be connected. Now bend the leads so that they press together, and a swift touch with the iron will result in a reliable joint. Mount the Darlington chip on to the board as shown in the diagram. The three leads to the trolley can now be connected Red to pin 10, White to pin 17 and Black to pin 18. The leads from the battery holder are connected Red (+3 volts) to pin 10, joining the motor lead, and Black (battery negative) to pin 9. Remember that the pins are numbered anticlockwise.

For Commodore and BBC users there are only three more connections to make – to the user port of your machine. On Commodore Pet, C64 and Vic the edge connector is 12 pins wide. Pin A, at the bottom left, is the ground connection and is to be connected to pin 9 of the chip. Pin C, third from the bottom left, is data bit 0 of the user port and you must connect this to pin 1 of the chip. Pin D is data bit 1 and must be connected to chip pin 2.

The BBC version of the kit includes a user port connector with a short length of ribbon cable already attached. The ribbon emerges from the bottom edge when plugged into the computer, and if left straight without twists will emerge from the front beneath the keyboard. In this position, wire number 1 will be on the right, and wire number 20 on the extreme left of the cable. Connect wire 19, which is a ground connection, to pin 9 of the chip. Connect wire 4 to pin 1 of the chip and wire 5 to pin 2.

Spectrum and ZX81 owners must add a second chip before they can try out their system. Mount the 74LS378 a little way from the first chip as shown, and use thin instrument wire to make the links between the chips. Connect pin 13 of the 378 chip to pin 1 of the ULN, connect pin 10 of the 378 to pin 2 of the ULN. These are the outputs of the latches, driving the inputs of the Darlington chip. Connect pin 8 of the 378 to pin 9 of the ULN, linking the grounds.

The expansion port connector for the Spectrum is five pins longer than the one for the ZX81, but the connections which matter here are in the same position in each case relative to the polarising slot. This slot is in position 3 on the ZX81, or position 5 on the Spectrum. Use a 23-pin length of 0.1 inch connector with the polarising pin in position 3, measured from the right when looking into the back of the computer. Now the pin numbers will be given for the ZX81 and this connector, with the Spectrum shown in brackets. Although missing, pin 3 is still counted.

Connect pin 4 lower (Spectrum) to pin 7 of the 378, to link the system ground. Connect pin 1 (3) lower to the 378 pin 16 to provide +5 volts for the chip. Connect pin 4 (6) upper to 378 pin 11. Connect pin 5 (7) upper to 378 pin 12. These are the data bus bits. Connect pin 15 (17) upper to 38 pin 1, computer I/O request to chip enable. Connect pin 17 (19) upper to 378 pin 9, WRITE strobe to the chip's clock.

Software for controlling the trolley

There are two programs. The second is the all-singing, all-dancing version which will remember a route. The first, however, is a simple test program.

For the BBC and Commodore computers you first need to 'configure' the output. The bits of the interface chip can be used for outputs or inputs in any combination, and a 'data direction register' controls which is which. This register appears as an address in memory, and if you store 255 in it all the bits will be outputs. According to your machine, type the following as a direct command.

```
BBC      ?&FE62=255 PO=&FE60
Pet      POKE 59459,255:PO=59471
C64      POKE 56579,255 PO=56577
Vic 20   POKE 37138,255:PO=37136
```

The port address has also been specified, so that the next instructions can be common for all Commodore machines.

Test also that the motors will stop by using the following direct command.

```
BBC      ?PO=0
CBM      POKE PO,0
```

The left motor should run with

```
BBC      ?PO=1
CBM      POKE PO,1
```

The right motor should run with:

```
BBC.     ?PO=2
CBM      POKE PO,2
```

Both motors should run with.

```
BBC      ?PO=3
CBM      POKE PO,3
```

Something a little more elaborate is needed for the Sinclair, since both motors will be set running any time a character is written to the screen.

```
10 LET a$=INKEY$
20 IF a$="r" THEN OUT 255,1
30 IF a$="l" THEN OUT 255,2
40 IF a$="f" THEN OUT 255,3
50 IF a$=" " THEN OUT 255,0
60 GO TO 10
```

Now when you run the program you should be able to control the trolley by pressing *f, l, r* or *Space*. (Note that there is a space between the quotes in Line 50)

The full program

Now you are ready for the full program.

Commodore:

```
10 POKE 59459,255:PO=59471: REM PET ***
10 POKE 56579,255:PO=56577: REM CBM64 ***
10 POKE 37138,255:PO=37136: REM VIC20 ***
20 DIM B(100),T(100)
30 N=0:TI$="000000"
40 POKE PO,0
100 GET A$
110 IF A$="" THEN 100
120 IF A$=" " THEN K=0
130 IF A$="R" THEN K=1
140 IF A$="L" THEN K=2
150 IF A$="F" THEN K=3
160 IF A$="G" THEN 300
170 N=N+1:IF N>100 THEN 300
180 B(N)=K
190 T(N)=TI
200 POKE PO,0
210 FOR J=1 TO 200:NEXT
220 POKE PO,K
230 GOTO 100
300 TI$="000000"
310 POKE PO,0
320 FOR M=1 TO N
330 IF TI<T(M) THEN 330
340 POKE PO,0
350 FOR J=1 TO 200:NEXT
360 POKE PO,B(M)
370 NEXT M
```

BBC:

```
10 DIM B(100)
20 DIM T(100)
30 N=0:TIME=0
40 J=0:K=0
50 PORT=&FE60:?&FE62=3
100 A$=INKEY$(0)
130 IF A$="" THEN 100
140 IF A$=" " THEN K=0
150 IF A$="L" THEN K=2
160 IF A$="R" THEN K=1
170 IF A$="F" THEN K=3
180 IF A$="G" THEN 300
190 N=N+1
200 B(N)=K
210 T(N)=TIME
220 ?PORT=0
230 J=INKEY(25)
240 ?PORT=K
250 GOTO 100
300 TIME=0
310 FOR M=1 TO N
320 REPEAT UNTIL TIME > T(M)
330 ?PORT=0
340 K=INKEY(25)
350 ?PORT=B(M)
360 NEXT M
```

Sinclair:

```
10 DIM b(100)
20 DIM t(100)
30 LET i=0: LET n=0: LET j=0: LET k=0
100 LET a$=INKEY$
110 LET j=j+1
120 IF i<j THEN GO TO 100
130 IF a$="" THEN GO TO 100
140 IF a$=" " THEN LET k=0
150 IF a$="l" THEN LET k=2
160 IF a$="r" THEN LET k=1
170 IF a$="f" THEN LET k=3
180 IF a$="g" THEN GO TO 300
190 LET n=n+1
200 LET b(n)=k
210 LET t(n)=j
220 OUT 255,0
230 FOR j=1 TO 100: NEXT j
240 OUT 255,k
250 LET j=1
260 GO TO 100
300 LET i=0
310 FOR m=1 TO n
320 FOR j=1 TO t(m): NEXT j
330 OUT 255,0
340 FOR j=1 TO 100: NEXT j
350 OUT 255,b(m)
360 NEXT m
370 OUT 255,0
```

Computers In Control

Finally

Having made and run the trolley you will surely want to move on to greater things There are two books – I have written *DIY Robotics and Sensors on the BBC Computer* and *DIY Robotics and Sensors on the Commodore 64 Computer*, which are being offered at a special discount to *Popular* readers – see coupon below They give a gentle introduction to the art of interfacing and move on to turtles and robot control You will also find joysticks and lightpens which you can construct yourself

Getting the parts

Popular Computing Weekly has arranged with Greenweld of Southampton to produce a kit consisting of everything you need to produce the buggy

There are slight differences between the kits required for each micro so make sure you indicate clearly which micro you own Prices are as follows

BBC, Spectrum, ZX81 ....£12 95
Commodore 64.. ....£11 95

Prices include postage and packing but not batteries For those who wish to buy all or some of the buggy themselves this is the full parts list

1 2-cell battery connector
3 metres each of 3 colours of single core cable (for connection to computer)
2 Wheels
3 metres of thin single core cable for wiring
1 small unclad connector board
1 ULN 2803 Darlington Chip
1 0 156 12-way connector (for the Commodore 64)

or

1 20-way connector with ribbon cable attached (for the BBC)

or

1 23-way 0 1 edge-connector with polarising plug in the third position (for the Spectrum)

The Spectrum version also requires
1 74LS 378 chip

If you do not wish to use the Greenweld gearbox and motors unit (available for £5 95) you will need 2 gearboxes (50 1 ratio or similar) and two small dc motors

Greenweld are also offering an Antex CS soldering iron with solder for £5 95 – usual retail is £7 95 – to anyone buying the kit – simply enclose the extra money with your order

Order form

Complete the form with your name and address, together with the version of the kit you want and the total value of your order and send in in to Popular Buggy Offer, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP

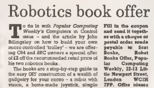
NOTE Cheques or postal orders should be made payable to Greenweld Ltd. Please allow 28 days for delivery Offer closes April 20.

Name ....

Address ....

	Price	Order value
C64 kit	£11 95	
Vic-20 kit	£11 95	
Spectrum kit	£12.95	
ZX81 kit	£12.95	
BBC kit	£12 95	
Gearbox and motor unit only	£5 95	
Wheels (pair)	£2 80	
Antex soldering kit	£5.95	
Total payable		

Special Offer



Robotics book offer

To tie in with *Popular Computing Weekly's* Computers in Control issue – and the article by John Billingsley on how to build your own micro controlled 'trolley' – we are offering C64 and BBC owners a special offer of £2 off the recommended retail price of his two robotics books

The books are a step-by-step guide to the easy DIY construction of a wealth of gadgetry for your micro – a robot with vision, a home-made joystick, simple stepper-motor operation. It's all in his books

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Power to the pedal

Christina Erskine – totally without electrical assistance – interviews Barrie Wills of Sinclair Vehicles

There are no C5s in the staff car park at Sinclair Vehicles just outside Coventry which, when you consider that Ford's car park in Dagenham, for example, is full of Escorts and Sierras, seems a little odd.

I asked Barrie Wills, Sinclair Vehicles' managing director, about this apparent lack of faith among the 35 employees. He grinned. "Our staff travel here from all over the place – many of them from beyond the C5's battery range."

Even if the staff don't use C5s to travel to work, Sinclair Vehicles are now claiming sales of over 5,000 ranging from 14-year-olds, since the C5 requires no licence, to a 92-year-old in Weston-super-Mare. The C5 has attracted huge attention since its launch in January – and has kept several cartoonists in gainful employment. I asked Barrie how he felt about the considerable lampooning of the C5.

"It's great. It's fine. It's a very positive thing. It means that C5 has caught people's imagination. The comments being made about C5 now are in the same vein as those that accompanied the launch of the Mini in 1959, but they didn't stop the Mini being astoundingly successful."

Nor has it taken long for folklore to spring up around the C5 – Sinclair Vehicles is *not* a division of Sinclair Research, it *hasn't* swallowed up all the profits the Spectrum ever made, and it *doesn't* run on a washing machine motor. Barrie explains: "Sinclair Vehicles and Sinclair Research are two separate companies with a common chairman – Sir Clive – who owns a majority of both. Sinclair Vehicles is funded by money raised by a private placing of 10% of Sir Clive's Sinclair Research shares. The motor is made by the Italian firm Polymotor, who manufacture a broad range of motors – which, yes, includes washing machine motors, but then they make torpedo motors as well."

Lateral thinking

The C5, as Sinclair Vehicles have stressed, is not an isolated product, but the first part of a family of electric vehicles which will eventually comprise the C5, C10 and C15. 'C', incidentally, stands for 'Clive', and motor industry convention dictates that one doesn't begin a range at number one. It has been widely supposed that the C15, the last member of that family, planned for the 1990s, would be more or less a conventional 'car' in appearance – unlike the C5. Barrie, however, is quick to dispel that view.

"An orthodox looking electric car will probably never happen, largely because of the problems of power storage," Barrie said. "And it's not certain that our future products will be 'cars'. While C5 is classified as an electrically assisted tricycle, our next vehicle will not be in that category – but then it won't be a car either. The third and final model might be a car – though it won't look like one. This last model is one that should come closest to today's family car.

"Because of battery storage problems, the third vehicle will require a different power system from lead acid batteries, and that will take time to develop. The second model – C5's successor – will, too, have to take account of the lead acid battery limitations. Some elements of Sir Clive's capacity for lateral thinking will come into play here."

A straight line

This is all very tantalising, and there's a large amount of 'wait and see' undertones in what Barrie says. For the present, Sinclair Vehicles has the much more immediate problem of the Doubting Thomases who have suggested that the C5 is unsafe.

The whole subject of whether the C5 is unstable, unreliable or invisible is obviously one that Barrie is heartily sick of.

"The only organisation that is saying this is the British Safety Council. Local councils, ROSPA and the GLC Safety Committee, on the other hand, have all been very supportive. We did a lot of research into the safety aspects, we consulted organisations like ROSPA and worked closely with them, and listened to what they had to say.

"On the subject of stability, C5 keeps a straighter line than either bicycles or mopeds. With three wheels, it's a safer alternative to two wheeled machines, again like bicycles and mopeds.

"People say C5s and trucks don't mix on the road, and comment on how the C5 can't be easily seen. But the C5 *can* be seen from a truck – far more easily – again – than a bicycle.

"I suspect that the safety debate surrounding C5 is actually part of a wider concern about road safety generally – and a debate on road safety overall is to be welcomed."

Controversy has also sprung up around the position of the C5's steering column – under the driver's seat.

"This is something we felt to be ergonomically desirable – as is the position of the seat in relation to the pedals. The steering bar lies where your hands would naturally fall, and so is much less tiring – it also means that the steering bar doesn't get in the way if you need to get out of the C5 in an emergency."

Yet another 'first' that the C5 heralded was the use of polypropylene – unsaturated plastic – for the body.

"Many car manufacturers are using polypropylene for bumpers, for instance – Rover for one. It is beginning to come into use, too, for fascias and crashpads, because it will take impact without shattering and then return to its original shape.

"We carried out tests at MIRA (Motor Industry Research Association) to find out what happened to occupants hitting a wall at 15 mph, C5's maximum speed. The front canopy on C5 tends to restrain the occupant, and bends against the chest rather than digging into it. The driver doesn't get away totally unhurt, obviously, but isn't badly damaged."

When it comes to the car industry, Barrie's pedigree is impeccable. He began his career at Jaguar as an apprentice 25 years ago. Ten years later, at Leyland, he was one of the prime instigators of the now familiar Leyland single decker bus.



From there, he went on to the Reliant Motor Company for seven years, then spent a four and a half year spell at De Lorean in Northern Ireland. He was the first UK national recruited at De Lorean, and was its chief executive.

"The whole De Lorean affair was very messy and far too few people know just how close it came to being a success. In two years the plant went from a slice of Irish bog to the most modern car plant in Europe. The tragedy of it all was that we employed 2000 people, many of whom had never worked before in their lives and who probably are back on the dole again now."

Sir Clive Sinclair invited Barrie to join Sinclair Vehicles as its managing director two years ago. It was largely the radical ideas behind Sinclair Vehicles that encouraged Barrie to join. "If the vehicles had been intended to be like conventional cars, I would never have said yes," he claims.

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It carries the Kevin Toms hallmarks of attention to detail and carefully tuned difficulty that made Football Manager such a hit. What makes this game a winner is the mastery of the art of suspense that also characterised FM where lesser simulations would have instantly shown you the positions of the monthly software chart, here you are made to wait and sweat whilst your games slowly inch their way up. Very Addictive. *Popular Computing Weekly, 14th February 1985*

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The cat's whiskers

***Graham Taylor** investigates the uses of robots*

It can be difficult defending the actual point of owning a micro-controlled robot.

When it comes to a small, rather slow object, with wheels and a pen that goes up and down, that reminds the unbiased observer of nothing so much as an unfinished bump-and-go toy with bits of Lego stuck on it – what could possibly be the actual point of that?

The Zero 2 is such an object and pretty soon you'll be able to buy one to link to your micro at around £100

Buggy? Turtles? Robots? Call it what you like, it looks like being developed and extended in a growing system. Its manufacturers the awesomely titled InterGalactic Robots, believe obviously that the Zero 2 will do well and that many people will find a reason to buy it. But what will they *do* with it?

The person responsible for developing uses for the Zero 2 is Richard Greenhill and his London home has become a treasure trove (or nightmare if you are of an orderly turn of mind) of oddly twisted pieces of wire, valves, bits of curiously shaped plastic, nozzles, flanges, pliers, solder, watering cans (?), Heath Robinson-like diagrams, and a computer or two

There is a big difference between the question of what the Zero 2 or any other similar robot could be persuaded to do out of interest and a sense of fun and whether there is actually any hard and fast practical reason for its use

For example, there is no point in spending £100 just to entertain your cat, but if you have a Zero anyway one of the simplest and most entertaining things to try first is connecting a rod with a piece of string to the end of it, writing four lines of program to make the Zero dart about randomly and introducing your cat to it.

Accept the idea that, in the home anyway, robots are for entertainment and experiment and that while they can be persuaded to do 'practical' things they are almost never actually 'useful' in the cold light of day.

On the other hand the possibilities of the machine are as open-ended as the computer itself

Richard has spent several months thinking about the Zero 2 and constructing simple devices to go with it The range of ideas is impressive and some of them are used in the rest of this article to answer the question "What can you do with a robot?"

1) Games. "In the future people are going to wonder how they could ever have been interested in games on-screen in the same way that they now wonder how they could ever bear to play games with no sound or colour. Having the thing happening 'for real' in front of you is infinitely more entertaining" Richard has various odd attachments that roll dice and it would be fairly easy to get it to move pieces on a board or move around the board itself. Probably the best fun is going to be the most violent, get two players with Zeros equipped with bump sensors and there could be all sorts of games involving bumping your opponent like mini dodgems

2) In the home. Feeding the cat "I've used a simple valve contraption that is worked by the pen up/down mechanism and can be made to squirt water into the cat's dish every so often – the same mechanism could water the plants at regular intervals or spray paint accurately" Pattern cutting "We could produce a tape of programs for a number of popular sewing patterns which could be customised on the computer with your own height, size details – than the Zero could draw it out and produce a pattern fully adapted to your shape" The same logic applies to anything similar like woodworking patterns Sweep up the carpet (Richard's version uses what appears to be an old toothbrush)

Photographers could find a number of functions for Zero it could be instructed to take time-lapse photos over many days or hours from selected viewpoints, home animators could use it to steadily move models a select amount for smooth effects, other repetitive tasks like shaking test tubes could easily be accomplished.

3) Education. In this area more than any other the Zero and its ilk are really useful linking the machine to Logo obviously means it can act like turtle moving and drawing according to Logo instructions Guessing exercises where Zero draws a line or angle and its value is estimated (the robot knows exactly), it can write words and be used in lessons in area, volume and trajectory generating more excitement and enthusiasm than blackboard and chalk ever could. Teaching music could involve Zero literally pressing the keys of a keyboard showing exactly which notes to press.

4) Artificial intelligence. Much recent work has involved giving computers a sense of what's going on in the world. bumpers fixed to the robot can be used as a 'feeler' for the computer and it can use this information to construct a simple picture of its environment.



A directory of robotics suppliers. With so many different robots and micro controlled devices trundling about all over the place here is a useful guide to some of the available products.

Device	*Type*	*Micro*	*Price*	*Supplier*
Ogre 1	Robot arm	C64/Vic 20	£224.25	L W Staines, Unit 2, Roding Trading Estate London Road, Barking, Essex 01-591 2900
Zero 2	Turtle robot	BBC/Spectrum Atari/Amstrad	£75.95 (kit) £99.99	IGR, Unit 208, Highbury Workshop, 22 Highbury Grove, London N5 01-359 2536
Trundle	Turtle robot	ZX81	£49.95	Maplin, PO Box 3, Rayleigh, Essex SS6 8LR. 0702-552911
Hero 1	Robot	In-built	£1,299 (kit) £2,199	Maplin, PO Box3, Rayleigh, Essex SS6 8LR 0702-552911
Hero Jr	Robot	In-built	£899 (kit) £1,099	Maplin, PO Box3, Rayleigh, Essex SS6 8LR 0702-552911
HRA933/4	Robot arm	BBC/Pet/Apple II/ TRS-80/RML 380Z	£2,524 £3,136	Feedback Instruments Park Road, Crowborough, Sussex 08926 3322
Jessop Turtle	Turtle robot	Sinclair/Atari/ CBM/Acorn	£182.27	Jessop Microelectronics, Unit 5, 7 Long Street, London E2
Beasty Arm	Robot arm	BBC/Spectrum	£110	Commotion, 241 Green Street, Enfield Middx. 01-804 1378
BBC Buggy	Turtle robot	BBC	£128	Economatics, 4 Orgreve Cresent, Dore House Industrial Estate, Handsworth, Sheffield. 0742 590801
Valiant Turtle	Turtle robot	BBC/C64/Spectrum/ RML380/RML480/ Apple IIe/IBM PC	£199.95	Valiant Designs, Park House, 140 Battersea Park Road, London SW11 01-720 3947
Herbot II	Turtle robot	ZX81 and others	£109.25	Powertran Cybernetics, West Portway Industrial Estate, Andover Hants 0264 64455
Micrograsp	Robot arm	ZX81 and others	£247.25	Powertran Cybernetics, see above
Movits range of robots (eight devices)	Self contained robots	Not applicable	Ranging from £14.95 to £29.95	Commotion, 241 Green Street, Enfield, Middx.
Armroid I	Robot arm	BBC/Spectrum/C64/	£843.10	Colne Robotics, Beaufort Road off Richmond Road, Twickenham, Middx 01-892 8197
Fischer Technik robot kit	DIY robots kit	BBC	£115	Commotion, see above 01-804 1378
Hobby robot (avail. Summer)	Robot	Self-standing	Around £300	Reckse Robots, Beaufort Road, East Twickenham, Middx. 01-892 2877

Grave Robbers

An active picture incorporating a game for the 48K Spectrum by *John de Rivaz*

On an alien planet in a distant galaxy, UFOs are seen to hover over new graves and fly off. A lone scientist has set up a scanner atop a church tower, and aims to discover the purpose of the UFOs. If a scan is made under just the right conditions, data is built up on the UFOs, and their purpose is discovered.

The program can just be viewed as an active picture, with changing cloud patterns scurrying over the scene below, which includes random visits by funerals and grave making. However, press any letter (upper or lower case) to fire the scanner. Eventually you will notice that the gibberish message at the bottom of the screen starts to make sense. You will discover that you have to hit the UFOs under certain conditions in order to get letters decoded.

Program notes

Line no

Line no	
100-480	Set up machine code, graphics and coded string. The introductory text is shown on the screen so it can be read during the set-up process. An "anykey" message is presented when the setting up is completed. Verification of machine code, graphics and coded text is provided to aid typing in.
490-500	The main loop
530-710	The cloud generator and top scroller
740-800	Hearse routine. Also calls make grave
830-880	Make grave. It is a square of bright white paper in order to avoid being scrolled.
910-1050	The UFO routine. It checks that it does not alter paper settings.
1080-1180	Scanner routine
1340-1420	Print message. It is gradually decoded as hits are made
8000	Save game. Note the poke that enables three saves to be made without "anykey" message.

Note — the letters in lines 390,400,430,440, and 1030 are special graphics. Also '£' signs in the listing should be entered as '#'.



```
100 REM enter scroll routine
110 REM
120 DATA 17,255,63,33,32,0,25,2
29,213,17,0,72,237,82,209,225,56
,5,33,125,92,53,201,167,6,32,203
,22,43,16,251,33,32,0,25,235,24,
221
130 LET rt=PEEK 23730+256*PEEK
23731
140 CLEAR rt-39
150 PRINT PAPER 2; INK 7;"GRAV
E ROBBERS FROM DIMENSION X"
160 PRINT INK 7; PAPER 5;"You
will see a quiet scene.Thereis a
 sinister church and whitefluf
fy clouds pass overhead. Butsoon
 you will see the sky darkenand
 a UFO will fly across. Ahear
se will pull up outside thechur
ch, and a grave with a starkmarb
le slab will appear.
170 PRINT INK 7; PAPER 1;"When
 you get bored, try pressingany
letter, lower or upper case.This
 is your sensor beam. If youhit
 a UFO with it, you willgath
er data.
180 PRINT INK 7; PAPER 4;"At f
irst all you see appears tobe
random letters. But soon younoti
ce that if you hit a UFOunde
r certain special circumst-ance
s, you will find that thetext
 starts to make sense, andyou
discover the secret of theUFOs
.
190 LET rt=PEEK 23730+256*PEEK
23731
200 LET test=0: FOR f=rt TO rt+
37: READ a: LET test=test+a: POK
E f,a: NEXT f: REM test<>3585 TH
EN PRINT " DATA ERROR ": STOP
210 REM special graphics
```

```
220 REM
230 DATA 0,0,0,0,0,0,0,15,1,3,6
,12,24,48,127,255,255,0,0,0,0,0,
255,255,255,255,224,224,192,192,
255,255,255,255,0,0,0,0,255,255,
255,255,3,3,1,1,255,255,192,192,
224,224,240,240,240,248
240 DATA 1,31,63,63,127,127,255
,0,255,255,255,255,255,255,126,6
0,255,255,255,255,255,255,255,0,
252,252,254,254,254,252,255,0
250 DATA 255,249,249,249,240,24
0,240,240,231,195,195,129,129,12
9,0,0,251,241,224,192,192,128,12
8,128,255,255,255,127,127,63,63,
63,31,31,31,31,31,31,31,31,112,2
48,112,32,240,240,240,240,0,24,6
0,255,60,24,0,0
260 DATA 999
270 RESTORE 230
280 LET test=0: FOR n=USR "a" T
O USR "u"+7: READ n1: IF n1>255
THEN  GO TO 300
290 POKE n,n1: LET test=test+n1
: NEXT n
300 IF test<>20702 THEN  PRINT
"GRAPHIC ERROR": STOP
310 REM enter & verify coded te
xt
320 REM ______________________
_
330 LET s$=CHR$ 32: FOR n=0 TO
4: LET s$=s$+s$: NEXT n
340 LET b$=s$+"\rx£kdz:$hawht(j
wjj&zngz'(ol'\NN((zeo(ugEevear$l
wt(wfr&gl;&jh(b3'hv1(!pi ,ohdg$t
;stp;%4wj%skgtosh(1k'vv(:vwltquE
zrvgh2"+s$
350 LET tbs=0: FOR n=1+LEN s$ T
O LEN b$-LEN s$: LET tbs=tbs+COD
E b$(n): NEXT n
360 IF tbs<>11595 THEN  PRINT "
STRING ERROR IN b$": STOP
370 REM prepare screen area
380 REM
390 LET h$=" ABCDEFG"
400 LET g$="H(JJJJIK"
410 PRINT £1;"Press any key to
continue.": PAUSE 0: BORDER 7: C
LS
420 LET ik=7: LET l=0: LET ux=1
: LET uy=1: LET g=1: LET gf=1: L
ET in=1: LET hearse=1: LET gx=6:
 LET gy=10: FOR n=0 TO 7: PRINT
INK 7; PAPER 5;AT n,0;s$: NEXT
n
430 PRINT       INK 0; PAPER 5;
"  O  Q
"
440 PRINT       INK 0; PAPER 4;
"  [illegible]
Q"
450 REM  Insert  paper  colour
characters  to make door red and
main  windows  magenta and tower
windows  white.  Re-set paper to
green.
460 FOR n=1 TO 2: PRINT  INK 0;
 PAPER 6;s$( TO 24);  PAPER 0;s$
( TO 8): NEXT n: PRINT  INK 0; P
APER 4;s$;s$;s$;s$;: PRINT £1;AT
 0,0; PAPER 4;s$;s$;
470 REM main loop
480 REM
490 GO SUB 1080: IF RND>.99 THE
N  GO SUB 910
500 GO SUB 530: GO SUB 740: GO
TO 490
510 REM clouds
520 REM
530 IF l>0 THEN  GO TO 560
540 IF RND>.1 THEN  GO TO 700
550 LET l=INT (100*RND): LET l1
=l/2: LET s=175-INT (64*RND):
LET w=1
560 LET l=l-1
570 LET s=s-2+INT (5*RND)
580 IF s>175 THEN  LET s=175
590 IF s<112 THEN  LET s=112
600 LET w=w-2+INT (5*RND)+(l>l1
)-(l<l1)
610 IF w<1 THEN  LET w=1
620 IF w>64 THEN  LET w=64
630 LET p1=s+w/2
640 IF p1>175 THEN  LET p1=175
650 IF p1<112 THEN  LET p1=112
660 LET p2=s-w/2
670 IF p2>175 THEN  LET p2=175
680 IF p2<112 THEN  LET p2=112
690 PLOT  INK ik;255,p1: DRAW
INK ik;0,p2-p1
700 POKE rt+2,63: POKE rt+11,72
: LET a=USR rt
710 RETURN
720 REM hearse
730 REM
740 LET rl=.99: LET rv=RND: IF
hearse=0 AND rv<rl THEN  RETUR
N
750 IF hearse>0 THEN  LET hears
e=hearse+1: IF hearse=20 THEN  L
ET hearse=0: GO SUB 830: POKE rt
+2,79: POKE rt+11,88: FOR n=1 TO
 66: GO SUB 1080: LET a=USR rt:
NEXT n
760 IF rv<rl THEN  RETURN
770 PRINT  INK 0; PAPER 0;AT 16
,24;h$;AT 17,24;g$
780 IF hearse>0 THEN  GO SUB 83
0
790 LET hearse=1
800 POKE rt+2,79: POKE rt+11,88
: FOR n=1 TO 190: GO SUB 1080: L
ET a=USR rt: NEXT n: RETURN
810 REM make grave
820 REM
830 IF gy<16 THEN  LET gx=gx+2:
 IF gx>31 THEN  LET gx=22: LET g
y=gy+2
840 IF gy=16 OR gy=17 THEN  LET
 gy=18: LET gx=-2
850 IF gy>17 THEN  LET gx=gx+2:
 IF gx>31 THEN  LET gy=gy+2: LET
 gx=0
860 IF gy>=21 THEN  LET gy=10:
LET gx=20: GO TO 830
870 PRINT AT gy,gx; BRIGHT 1: P
APER 7;" "
880 RETURN
890 REM UFO
900 REM
910 LET fs=1: BORDER 1: LET ik=
0: FOR n=0 TO 8: PRINT AT n,0; P
APER 1; OVER 1; INK 0;s$: NEXT n

920 LET rg=RND: LET inc=1: LET
rs=inc: LET ux=INT (32*RND): LET
 uy=0: IF RND>.5 THEN  LET rs=-r
s
930 GO SUB 1020: GO SUB 1000
940 GO SUB 1020
950 LET ux=ux+inc*rs*rg: LET uy
=uy+inc
960 IF uy<0 THEN  GO TO 1040
970 IF ux>31 OR uy>21 OR ux<0 O
R uy<0 THEN  LET inc=-inc: GO TO
 950
980 IF ATTR (uy,ux)=120 THEN  B
EEP 1,1: PRINT AT UY,UX; OVER 1;
 BRIGHT 1; PAPER 7; FLASH 1;" ":
 PAUSE 10: PRINT AT UY,UX; OVER
1; BRIGHT 1; PAPER 7; FLASH 0;"
": LET inc=-inc: LET gf=1: GO TO
 950
990 GO TO 930
1000 REM print UFO
1010 REM ---------
1020 LET up=INT (ATTR (uy,ux)/8)

1030 PRINT  OVER 1; PAPER up;AT
uy,ux;"R": RETURN
1040 LET fs=0: LET gl=fs: LET ik
=7: FOR n=0 TO 7: PRINT AT n,0;
PAPER 5; OVER 1; INK ik;s$: NEXT
 n: BORDER 7: PRINT £1;AT 0,0; P
APER 4;s$;s$;
1050 PRINT AT 8,0; PAPER 5; OVER
 1; INK 0;s$: RETURN
1060 REM fire probe routine
1070 REM
1080 LET a$=INKEY$: IF a$="" THE
N  RETURN
1090 IF a$<"a" OR a$>"z" THEN  G
O TO 1110
1100 LET m=(CODE a$-96): GO TO 1
130
1110 IF a$<"A" OR a$>"Z" THEN  L
ET fs=0: RETURN
1120 LET m=-(CODE a$-64)
1130 IF a$="z" OR a$="Z" THEN  L
ET x1=38: LET y1=175: GO TO 1180

1140 LET m=TAN (m*PI/52): LET c=
116-38*m
1150 IF m>=0 THEN  LET y1=255*m+
c: IF y1<175 THEN  LET x1=255: G
O TO 1180
1160 IF m<0 THEN  LET y1=m+c: IF
 y1<175 THEN  LET x1=0: GO TO 11
80
1170 LET y1=175: LET x1=(175-c)/
m
1180 GO SUB 1260
1190 REM check if scanned
1200 REM ---------------
1210 IF fs=0 OR uy>7 THEN  GO TO
 1250
1220 LET ufy=m*ux*8+c-(21-uy)*8:
 IF ufy>0 AND ufy<8 THEN  GO TO
1300
1230 LET ufx=((21-uy)*8-c)/m-ux*
8: IF ufx>0 AND ufx<8 THEN  GO T
O 1300
1240 REM --------------- end
1250 BEEP .01,.01
1260 PLOT  INK ik; OVER 1;38,116

1270 DRAW  INK ik; OVER 1;x1-38,
y1-116: RETURN
1280 REM evaluate effect of hit
1290 REM -- ------------- --
1300 IF gl=0 THEN  GO SUB 1360:
GO TO 1240
1310 GO SUB 1340: LET g=g+1: GO
TO 1250
1320 REM print message
1330 REM
1340 LET n=1+LEN s$: IF g>37 THE
N  GO TO 1360
1350 IF (g+n)<=LEN b$-LEN s$ THE
N  GO TO 1410
1360 PRINT £1; PAPER 4; INK 7;AT
 1,0;"Press [ to abort text.
      ";: FOR n=1 TO LEN b$-31:
PRINT £1; PAPER 4; INK 7;AT 0,0;
b$(n TO n+31)
1370 REM See if user wants to ab
ort
1380 REM ----------------------
---
1390 IF INKEY$="[" THEN  PRINT £
1;AT 0,0; PAPER 4; INK 7;s$+s$;:
 RETURN
1400 PAUSE 4: NEXT n: RETURN
1410 LET b$(g+n)=CHR$ (CODE b$(g
+n)-INT (g/6+3))
1420 LET n=n+36: GO TO 1350
8992 REM save program
8994 REM
9000 FOR F=1 TO 3: POKE 23736,18
1: SAVE "UFO": NEXT F
```

A work of art

Graphic design with a joystick on the BBC B by ***John Billingsley***

The functions which this program provides are *Point, Line, Fill, Centre* and *Shape*, whilst the colour is set by pressing a number between one and eight. As the joystick is moved, a fleeting dot moves about the screen. Pressing *P* marks a fixed dot onto the screen, and also memorises the co-ordinates of the point in an array of 'last four points'.

If the joystick is moved and *L* is pressed, a line is drawn from the last recorded point. Another move and another *L* draws a second line from the end of the first, and so on. If the *L* key is held down, line segments will be drawn in swift succession, forming a smooth curve drawn by the joystick movement.

Record a point with *P*, move the joystick, record a second point, move the joystick again and press *F*. The triangle defined by the points will be Filled in with solid colour.

Holding down *F* and moving the joystick does not produce a satisfactory effect, the result is just a rather fat line, as each set of three points along the trail is filled. If you wish to fill a shape you must first define a centre within it – move the joystick and press *C*. Now each time you press *S*, the triangle formed by the centre, the present point will be filled in. Holding *S* you can draw and fill in any shape surrounding the centre, provided the radius does not try to 'double back'. By a nimble redefinition of centre, you can draw shapes as convoluted as you wish.

To avoid accidentally erasing the work of art, the clear command is an exclamation mark, requiring you to hold 'shift' at the same time. At any stage a number key can be pressed to define a new colour.

Now you can let your artistic talents run wild. You will need a very steady hand to drive the joystick when holding down a key for continuous writing, and you should take care to let the stored-up keystrokes run out afterwards.

This program is an edited extract from *DIY Robotics and Sensors with the BBC computer* by John Billingsley (published by Sunshine Books at £6.95). Greater detail of the program itself and the principles it embodies can be found within its pages.

```
  10 MODE2:VDU 5:REM GAPHICS WITH SEVEN STE
ADY COLURS
  20 COM$="PLFCS'":REM STRING OF COMMAND LE
TTERS
  30 DIM X(3),Y(3):REM STORE FOR LAST THREE
 POINTS
  40 SCALE=30:LIM=1000:F=2
  50 COL=7:OC=0:X=-1:Y=-1:XC=500:YC=500:N=0
 100 PROCJOY
 110 MOVE0,0:GCOL 0,COL:COLOUR COL:VDU255
 120 A$=INKEY$ 5:IFA$=""THEN100
 130 A=VAL(A$):IF A>0 THEN COL=(A-1)AND 7:GO
TO 100
 140 A=INSTR(COM$,A$):IF A=0 THEN 100
 150 IF A=1 THEN GOSUB 190
 160 GCOL 0,OC:PLOT 69,X,Y:GCOL 0,COL
 170 GOSUB A*100:OC=POINT(X,Y):GOTO 100
 180 N=(N+1)AND3:X(N)=X:Y(N)=Y:OC=7-OC:RETURN
 190 N=(N+1)AND3:X(N)=X:Y(N)=Y:OC=7-OC:RETURN
 200 GOSUB 190:M=(N-1)AND3:GCOL 0,COL
 210 MOVE X(M),Y(M):DRAW X(N),Y(N):RETURN
 300 GOSUB 190:FORI=1 TO 3:MOVE X,Y:NEXT
 310 FOR I=0 TO 2:PLOT 85,X((N-I)AND3),Y((N-
I)AND3):NEXT
 320 RETURN
 400 GOSUB 190:XC=X:YC=Y
 410 FOR I=0 TO 3:MOVE X,Y:X(I)=X:Y(I)=Y:NEX
T:RETURN
 500 GOSUB 190
 510 FOR I=0 TO 1:MOVE X((N-I)AND3),Y((N-I)
AND3):NEXT
 520 PLOT 85,XC,YC:RETURN
 600 COLOUR 128:GCOL 0,128:CLS:OC=0:RETURN
1000 DEF PROCJOY
1010 GCOL 0,OC:PLOT 69,X,Y: REM PUT BACK OLD
 COLOUR
1020 X=ADVAL(1)/SCALE: REM SCALE DEPENDS ON
 SENSITIVITY
1030 Y=LIM-ADVAL(2)/SCALE :REM LIM=1000, Y
 INVERTED
1040 OC=POINT(X,Y):GCOL0,7-OC:PLOT 69,X,Y:R
EM PUT DOT
1050 ENDPROC
```



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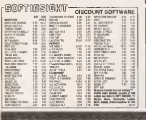
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Perfect listing

Smarten up your listings with these two procedures by
Gerald Phelan

Most UK computer users want to print '#' and '£' symbols on their printers. This gives users of Epson style printers a problem, because the '#' and '£' symbols are both printed as a result of the *ASCII* character 35 being sent to the printer. '#' is printed in US character mode and '£' in UK character mode. Since most UK users set the UK mode as the default, then *Open #6,ser1* in program listing appears as *Open £6,ser1*

Switching to the US mode is not the entire answer, because the QL uses *ASCII* 96 to represent the '£' you see on the screen. To print a '£' requires switching into UK mode and sending an *ASCII* 35 to the printer

Procedure *Printall* examines the file to be printed character by character, swapping character sets as required. This is much slower than *Copying* or *Saving* to the printer, but since you will only bother to do this when preparing documentation or magazine submissions, the speed is not so important

On these occasions you will want the clearest possible printing, since the default mode is not dense enough. So you may print in emphasised and double strike mode, which is the densest that the FX80 can do. This slows printing even more, but looks good

Where your program does not use '£' signs then the slow character by character examination is unnecessary and after setting the appropriate printer codes the file may be *Copyied* to the printer. Procedure *Prin* does this

Program notes – *Printall*

Line no

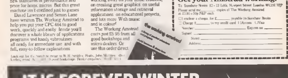
- 31010 – Ensures variables used are independent
- 31100 – Predefine escapes sequences, to simplify procedure. These codes apply to the Espon FX80, other may differ
- 31140 – Clear bottom window, leaving others untouched.
- 31180 – Open printer channel, ser1 is valid for FX80 with 8148 serial interface. Other printers/interfaces may differ.
- 31190 – Force printer into UK mode, if not already.
- 31200 – Select emphasised and double strike mode if requested.
- 31250 – Get file, character by character
- 31290 – # required, set US mode, print character, set UK mode
- 31330 – £ required, print ASCII 35 (printer is in UK mode)
- 31360 – Output all other characters printable or not
- 31410 – Reset printer to normal mode is required.

Program notes – *Prin*

Line no

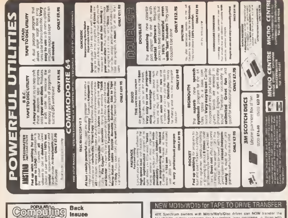
- 31100 – Ensures variables used are independent
- 30100 – Predefine escape sequences, to simplify procedure. These codes apply to the Epson FX80, others may differ.
- 30120 – Clear bottom window, leaving others untouched.
- 30160 – Open printer channel, SER1 is valid for FX80 with 8148 serial interface. Other printers/interfaces may differ.
- 30170 – Force printer into US modes
- 30180 – Select emphasised and double strike mode
- 30190 – Close channel to enable Copy to work.
- 30200 – Copy file in one go, removing header
- 30230 – Reset printer to normal mode if required

```
31000 DEFine PROCedure PRINTALL
31010 LOCal esc$,us$,uk$,empdeon$,
 empdeoff$,n,file$,bold$,char$,dec
31020 :
31030 REMark To print a file conta
 ining hashes and pounds
31040 REMark such as financial pro
 grams
31050 REMark assumes epson style p
 rinter defaulting to uk char set
31060 :
31070 REMark Gerard Phelan Feb 1985
31080 :
31090 esc$ = CHR$(27)
31100 us$=esc$&'R'&CHR$(0): REMark
 define US charset
31110 uk$=esc$&'R'&CHR$(3): REMark
 define UK charset
31120 empdson$=esc$&'E'&esc$&'G':
 REMark select emph/double strike
31130 empdeoff$=esc$&'F'&esc$&'H':
 REMark deselect
31140 CLS #0
31150 INPUT #0,'drive number 1/2?
 ';n
31160 INPUT #0,'file name? ';file$
31170 INPUT #0,'bold printing y/en
 ter? ';bold$
31180 OPEN #6,ser1
31190 PRINT #6,uk$;
31200 IF bold$ = 'y' THEN PRINT #6,
 empdeon$;
31210 OPEN_IN #5,'mdv'&n&'_'&file$
31220 :
31230 REPeat dataread
31240 IF EOF(#5): EXIT dataread
31250 char$ = INKEY$(#5,-1)
31260 dec = CODE(char$)
31270 IF dec = 35 THEN
31280    REMark  hash to print
31290    PRINT #6,us$&char$&uk$;
31300 ELSE
31310    IF dec = 96 THEN
31320       REMark pound to print
31330       PRINT #6,CHR$(35);
31340    ELSE
31350       REMark all other chars
 to print
31360       PRINT #6,char$;
31370    END IF
31380 END IF
31390 END REPeat dataread
31400 :
31410 IF bold$ = 'y' THEN PRINT #6,
 empdeoff$;
31420 CLOSE#5:CLOSE #6
31430 CLS #0
31440 PRINT #0,'--- printing compl
 eted ---'
31450 END DEFine
```



IT IS FOREVER WINTER . . .
ICE PALACE

```
30000 DEFine PROCedure PRIN
30010 LOCal esc$,empdson$,empdsoff$,n,file$,bold$
30020 :
30030 REMark To print a file containing hashes but not pounds
30040 REMark such as all non-financial programs
30050 REMark assumes epson style printer defaulting to uk char set
30060 :
30070 REMark Gerard Phelan Feb 1985
30080 :
30090 esc$ = CHR$(27)
30100 empdson$ = esc$&'E'&esc$&'G': REMark select emph/double strike
30110 empdsoff$ = esc$&'F'&esc$&'H': REMark deselect
30120 CLS #0
30130 INPUT #0,'drive number 1/2? ';n
30140 INPUT #0,'file name? ';file$
30150 INPUT #0,'bold printing y/enter? ';bold$
30160 OPEN #6,ser1
30170 PRINT #6,CHR$(27);'R';CHR$(0)
30180 IF bold$ = 'y' THEN PRINT #6,empdson$;
30190 CLOSE #6
30200 COPY_N 'mdv'&n&'_'&file$ TO ser1
30210 OPEN #6,ser1
30220 PRINT #6,CHR$(27);'R';CHR$(3)
30230 IF bold$ = 'y' THEN PRINT #6,empdsoff$;
30240 CLOSE #6
30250 CLS #0
30260 PRINT #0,'--- printing completed ---'
30270 END DEFine
```


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Brian Cadga

The machine code program presented here gives the Basic programmer the facility for 'Back ground Printing' This is a feature usually found on the better wordprocessors and the like Basically, what it means is that the computer can be printing a document whilst the basic program continues to do something else Using the printer usually hangs the computer up until printing has finished

To use the program type in the Basic loader program, *save* and *run* it If you have made any errors in the data statements the program will tell you and you should recheck your listing

Several new commands are now available to be used in your own programs which can now be loaded or typed in. Alternatively, the Basic loader program could be *merged* with your own program Line 90 would be changed to a *Goto* first line number, eg, 300 It is important that the code is only loaded once, so you should add to Line 5 as follows 5 *If Peek(41400) = 201 Then 300*

The new printer driver uses channel 7, instead of channel 8, the normal printer stream. So instead of using *List#8* to list a program to the printer, you can now use *List#7*. Similarly, use *Print#7*, instead of *Print#8* Channel 8 still operates as normal, but take care not to use it whilst #7 is active, or output will be mixed from both! The text window #7 cannot be used.

There are also four new RSX commands available All RSX's start with the ' ' character, obtained by Shift/@ These commands are,

Hold Temporarily suspends background printing *Esc* will no longer stop the printer

Release Restarts printing from the *Held* position

Kill Aborts all background printing immediately – any output waiting to go to the printer will be lost

Lfchar,n Sets the Linefeed character to 'n', the default is 10 Note the comma immediately after the command and before the number

If your printer leaves a blank line between each line printed then try typing *Lfchar,0*

A 2K buffer is used to store the characters to be output. If this ever fills up completely then the program will have to wait until room is available before continuing In practice, 2K is enough for most output to be stored, so that the program is not halted

To get the idea of what all this does, try listing the Basic loader program once it has run successfully, type, *List#7*. Instead of waiting for the printer, the *'ready'* prompt should return almost immediately You can now carry on using Basic as normal whilst the program is being listed on the printer You can also send more output whilst this is happening try typing ?#7 *"Amstrad"* This will be stored and printed after the listing

Now type *Hold*, the printer will stop typing *Release* will restart printing Typing *Kill* will halt the printer and all further output will be lost

If you want to know whether the printer is active in a program you can use *X = Peek(41735)+ Peek(41736)*256* to return the number of characters waiting to be printed.

You do not need to understand how the machine code program works to use the program, but the assembly language listing is included for anyone interested

The normal VDU print vector is redirected so that each time a character is printed the program checks to see if channel 7 is being used. If it is then the character is stored in the next available position in the buffer if not then the character is passed to the normal Rom screen printing routine

A 2K wrap-round buffer is used, with two pointers and one counter The counter holds the number of items in the buffer. The input Pointer points to the next available position, the Output Pointer points to the next character to be printed By taking Modulo 2048 a wrap-round buffer is created – this feature is important for the most efficient use of the buffer.

The actual printing is done by a 'Fast Ticker Event' This is a routine executed by the operating system 300 times a second Ticker Events on the Amstrad are a very powerful form of interrupts under the complete control of the operating system. There are several speeds of ticker 300 being the fastest.

This fast ticker event is set up in Lines 270 to 310 and starts at Line 1020 It firstly checks if there is anything to print and returns if not It also returns if the *Hold* flag is set. If there is a character in the buffer, then the Centronics port is checked. If the printer is 'Busy' the routine doesn't wait, it simply returns Providing the printer is ready the character is sent and the Output Pointer and Counter are adjusted

The RSX commands are set up in Lines 240-260 and 330-460 and the command routines start at Line 1340 For a fuller explanation of RSX commands see *Popular* Vol 3, numbers 50 and 51

```
0 REM Background [illegible]
20 MEMORY 413[illegible]
30 FOR [illegible] 1400 TO 4[illegible]
40 READ [illegible]
50 [illegible] :POKE
60 NEXT i
7 IF [illegible] THEN PRINT [illegible]
 ERROR - Chec[illegible]
8 CLS:PRINT"Background Printing [illegible] 1
 initiated":CALL 41400
90 END
100 DATA 3A,5A,B0,3 ,4 ,A2,2A,5B,BB, ,4
B,A2,3E,C3,32,5A,BB, 1,29,A2,22,5B
110 DATA BB,3E,C9, ,BB,A1,3 ,0A,32,0E,
3,3E,00,32,0D,A3,01,00,0 ,ED,4 ,07
1[illegible] DATA A3,ED,43,09, ,ED,4 ,0B,A[illegible]
4,A2,21,1E,A3,CD,D1,BC,[illegible]
1[illegible] DATA 21,0E,00,11,9E,A2,CD,E0,BC C[illegible]
2,A2,C3,E2,A2,C3,E8,A2,C3,FA,A2
140 DATA 00,A3,48,4F,4C,C4,48 [illegible] CC,5
2,[illegible],4C,4B,41,53,C5,4C,46 [illegible]
150 DA A D2,00,00,22,0F,A3,ED,4B,[illegible]
5,F1,22,13,A3,32, ,AB,CD, ,A2 3A
16 DATA 1 ,A ,E5,F1,ED,4B,[illegible]
3,C9,00,00,2A,1 ,A3,E5,F1,ED,4B,[illegible]
170 DATA A ,2A,0F,A3,C9, ,B4,3B,
 ,CD,B4,BB,7B,FE,07,20,01, , 3K
180 DATA 00,32,0D,A3,3A,[illegible] FE,0[illegible],
9,F3,ED,4B, 7,A3,-1,01, [illegible]
190 DATA A3,21,22,A ,ED,4 [illegible]
2,A8,77,ED,4B,09,A ,21 1, ,09,
200 DATA E6,07,47,22,09,A3,FB,C3,[illegible]
A,[illegible],A3,B7,C0,ED,4B,07,A3 [illegible],B0,20
210 DAT 01,C9,CD,2E BD, [illegible]30,ED,4B,0B,A
 ,21,22,A3,09, E,FE,DA, ,03,3A,0E
22 DATA A3,C0,2B,[illegible], 0, ,ED, B, B,A ,
1,01,00,09,7C, 6,07,67,22,0B,A3,2A
230 DATA 07,A3,0 ,01,00,B7,ED,47,2 0 ,A
3,C9,3E,F[illegible],32,0D,A3,[illegible],F ,01,00,
24 DATA ED,4 ,07,A3,FD,4 ,[illegible] ,E ,4 ,0
B,A ,FB,C9,[illegible], 0,32, D,A C9,DD 7E
250 DATA 00,[illegible]2,0[illegible],A3,C9
```

```
10 ;
20 ;Background Printing on CPC464 using channel #7
30 ;
40         ORG  41400
50         ENT  $
60 SETUP:  LD   A,(#BD2B)       ;Save Print vector
70         LD   (OSPRT),A
80         LD   HL,(#BD2C)
90         LD   (OSPRT+1),HL
100        LD   A,#C3           ;Set up new vector
110        LD   (#BD2B),A
120        LD   HL,USRPRT
130        LD   (#BD2C),HL
140        LD   A,#C9           ;Don't allow this setup
150        LD   (SETUP),A       ;to be re-executed
160        LD   A,10
170        LD   (LFCH),A        ;Default LF character
180        LD   A,0
190        LD   (HOLD),A
200        LD   BC,0
210        LD   (COUNT),BC
220        LD   (INPNT),BC
230        LD   (OUTPNT),BC
240        LD   BC,DESPAT        Set up RSX commands
250        LD   HL,OSBUF
260        CALL #BCD1             on RSX onto OS
270        LD   HL,FTBLK        ;adrs of fast ticker blk
280        LD   B,129           ;Event class (Async)
290        LD   C,0
300        LD   DE,TIKRT        ;Event address
310        CALL #BCE0           ;Initialize fast ticker
320        RET
330 DESPAT DEFW CMDS             R^ command table
340        JP   PAUSE
350        JP   KILL
360        JP   RELS
370        JP   SETLF
380 CMDS   DEFM "HOL"
390        DEFB "D"+128
400        DEFM "KIL"
410        DEFB "L"+128
420        DEFM "RELEAS"
430        DEFB "E"+128
440        DEFM "LFCHA"
450        DEFB "R"+128
460        DEFB 0,0
470
480 USRPRT LD   (REG),HL         Store register values
490        LD   (REG+2),BC
500        PUSH AF
510        POP  HL
520        LD   (REG+4),HL
530        LD   (CHAR),A         Store chr$ to Print
540        CALL PRINT           ;Goto checking routine
550        LD   HL,(REG+4)       If returns here then
560        PUSH HL              ;channel # isn't in
570        POP  AF              ;use so restore
580        LD   BC,(REG+2)      ;registers and jump to
590        LD   HL,(REG)        ;PCM Print routine
600 OSPRT  DEFB #C9,0,0
610 REST   LD   HL,(REG+4)       Restore the values
620        PUSH HL                of the registers and
630        POP  AF                return to OS
640        LD   BC,(REG+2)
650        LD   HL,(REG)
660        RET
670
680 PRINT  LD   A,0
690        CALL #BBB4            Get channel number
700        LD   B,A             ;save it in B
710        CALL #BBB4           ;Restore Previous channel
720        LD   A,B             ;Get channel in A
730        CP   7               ;Is it #7 ?
740        JR   Z,CHAN7          Yes  then Jump
750        RET
760 CHAN7  POP  HL               Remove return adrs from stack
770        LD   A,0
780        LD   (HOLD),A         Release any hold status
790 BUFFUL LD   A,(COUNT+1)      Check if there is room in the
800        CP   8               ;2K buffer
810        JR   Z,BUFFUL        ;If not then wait
820        DI
830        LD   BC,(COUNT)
840        LD   HL,1
850        ADD  HL,BC           ;Increment counter
860        LD   (COUNT),HL
870        LD   HL,BUFFER
880        LD   BC,(INPNT)
890        ADD  HL,BC            Get next buffer asrz
900        LD   A,(CHAR)        ;Get character to print
910        LD   (HL),A          ;Store it in buffer
920        LD   BC,(INPNT)
930        LD   HL,1
940        ADD  HL,BC           ;Increment input pointer
950        LD   A,H
960        AND  7               ;Modulo 2048
970        LD   H,A
980        LD   (INPNT),HL
990        EI
1000       JP   REST            ;Restore regs and return
1010
1020 TIKRT LD   A,(HOLD)        ;Check if HOLD is on
1030       OR   A
1040       RET  NZ              ;If yes  then return
1050       LD   BC,(COUNT)      ;Check if there is
1060       LD   A,C              anything in the
1070       OR   B               ;buffer to be printed
1080       JR   NZ,TRYPRT
1090       RET
1100 TRYPRT CALL #BD2E          ;Check is printer is busy
1110       JR   C,BUSY          ;Jump if it is
1120       LD   BC,(OUTPNT)
1130       LD   HL,BUFFER
1140       ADD  HL,BC           ;Get adrs of next char to prt
1150 SEND  LD   A,(HL)          ;Get the character from buffer
1160       CP   10              ;Is it a LF character ?
1170       JR   NZ,NOTLF        ;If not then jump
1180       LD   A,(LFCH)        ;Substitute new LF char
1190 NOTLF CALL #BD2B            Try and Print the char
1200       JR   NC,SEND         ;Try again if failed
1210       LD   BC,(OUTPNT)
1220       LD   HL,1
1230       ADD  HL,BC             Increment out Pointer
1240       LD   A,H
1250       AND  7               ;Modulo 2048
1260       LD   H,A
1270       LD   (OUTPNT),HL
1280       LD   HL,(COUNT)
1290       LD   BC,1
1300       OR   A
1310       SBC  HL,BC           ;Decrement counter
1320       LD   (COUNT),HL
1330 BUSY  RET
1340 PAUSE LD   A,255             |HOLD command
1350       LD   (HOLD),A        ;Set the hold flag
1360       RET
1370 KILL  DI
1380       LD   BC,0              |KILL command
1390       LD   (COUNT),BC      ;Reset all Pointers
1400       LD   (INPNT),BC      ;and counters
1410       LD   (OUTPNT),BC
1420       EI
1430       RET
1440 RELS  LD   A,0             ; |RELEASE command
1450       LD   (HOLD),A        ;Clear hold flag
1460       RET
1470 SETLF LD   A,(IX+0)        ; |LFCHAR command
1480       LD   (LFCH),A        ;Store new LF char
1490       RET
1500 COUNT DEFW 0
1510 INPNT DEFW 0
1520 OUTPNT DEFW 0
1530 HOLD  DEFB 0
1540 LFCH  DEFB 0
1550 REG   DEFS 6
1560 FTBLK DEFS 9
1570 OSBUF DEFS 4
1580 BUFFER DEFS 2048
1590 CHAR  DEFB 0
```

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A routine matter

*Spruce up your programs with these machine-code routines for the CBM64 written by **Gary Foreman***

Here are some machine code subroutines for the Commodore 64. They can be used to enhance your programs, either by making them run faster or by making them look better. There are seven routines.

BAR – draws a bar from the base of the screen, max height 199. To use *Poke* 251, height *Poke* 252,192 + × displacement: *Poke* 253,7 *Sys* 49152

SET – double-density plot routine, X in range 0-79, Y in range 0-49. To use *Poke* 251,X *Poke* 252,Y *Sys* 49200

BORDER SCROLL – to scroll outside edge of screen. To use *Sys* 49320

CHARS – copy char memory to 12288 for use with user defined graphics. To use *Sys* 49432

FILL SCREEN – fill screen with a specified character. To use *Poke* 251,char code: *Sys* 49480

OLD – restore *NEW*ed progam. To use *Sys* 49504

COLOR – set char, screen and border colours. To use *Sys* 49528,*char*,*bor*,*scr* (*char* is character colour, *bor* is border colour and *scr* is screen colour)

Along with the program to enter the code is a demo that has examples of the use of some of the above routines.

To use the Bar, Set and Border Scroll routines you must ensure that the colour Ram is set to the colour you want the data in. In the demo this is done by the following routine: *Sys* 49528,1,1,1 *Print*" <CLEAR> " *Sys* 49528,1,0,0. This sets char colour to white (1), border and screen colour to black (0) and colour Ram to white (the third 1 before the Clear screen)

```
100 I=49152 C=0
110 READA IFA=256THEN130
120 POKEI,A I=I+1 C=C+A GOTO110
130 IFC<>52456THENPRINT"** DATA ERROR **" END
140 PRINT"** DATA OK **"
150 DATA160,0,165,251,201,8,144,22
160 DATA233,8,133,251,169,160,145,252
170 DATA165,252,233,40,133,252,165,253
180 DATA233,0,133,253,176,228,170,240
190 DATA5,189,39,192,145,252,96,32
200 DATA100,111,121,98,248,247,227,0
210 DATA169,0,133,254,169,1,133,253
220 DATA165,251,201,80,176,56,165,252
230 DATA201,50,176,50,169,50,229,252
240 DATA70,251,38,254,106,38,254,133
250 DATA252,10,10,101,252,10,10,38
260 DATA253,10,38,253,234,234,234,133
270 DATA252,166,254,189,147,192,133,254
280 DATA164,251,177,252,162,15,221,151
290 DATA192,240,4,202,16,248,96,173
300 DATA146,192,240,6,138,5,254,170
310 DATA208,8,138,73,255,5,254,73
320 DATA255,170,189,151,192,164,251,145
330 DATA252,96,1,1,2,4,8,32
340 DATA126,123,97,124,226,255,236,108
350 DATA127,98,252,225,251,254,160,0
360 DATA173,39,4,133,251,173,192,7
370 DATA133,252,162,39,189,255,3,157
380 DATA0,4,202,208,247,189,193,7
390 DATA157,192,7,232,224,39,208,245
400 DATA162,24,169,191,133,20,169,7
410 DATA133,21,160,0,177,20,160,40
420 DATA145,20,56,165,20,233,40,133
430 DATA20,165,21,233,0,133,21,202
440 DATA208,232,162,24,169,0,133,20
450 DATA169,4,133,21,160,40,177,20
460 DATA160,0,145,20,24,165,20,105
470 DATA40,133,20,165,21,105,0,133
480 DATA21,202,208,232,165,251,141,79
490 DATA4,165,252,141,152,7,96,0
500 DATA169,0,133,251,133,253,169,48
510 DATA133,252,169,208,133,254,162,8
520 DATA120,169,51,133,1,160,0,177
530 DATA253,145,251,136,208,249,230,252
540 DATA230,254,202,208,242,169,55,133
550 DATA1,88,96,0,0,0,0,0
560 DATA165,251,162,0,157,0,4,157
570 DATA0,5,157,0,6,157,232,6
580 DATA202,208,241,96,0,0,0,0
590 DATA169,1,168,145,43,32,51,165
600 DATA165,34,24,105,2,133,45,165
610 DATA35,105,0,133,46,76,94,166
620 DATA32,253,174,32,158,183,142,134
630 DATA2,32,253,174,32,158,183,142
640 DATA32,208,32,253,174,32,158,183
650 DATA142,33,208,96,256
```

```
1 CO=49528 FS=49480 BS=49320 SE=49200 BA=491
  52
2 SYSCO,1,1,1 PRINT"████THIS WAS WRITTEN F
  OR P.C.W." SYSCO,1,0,0
3 PRINTTAB(9)"█BY GARY 1. FOREMAN"
4 PRINT"████████████████"TAB(10)"WATCH THIS
  SPACE..." REM 16 CRSR DOWN
5 R=5 NR=1 XO=15 YO=35:GOSUB31
6 X=10 Y=19 XS=0 YS=1 L=16 GOSUB35
7 R=5 NR=.5 XO=30 YO=35 GOSUB31
8 X=25 Y=22 L=13 GOSUB35
9 R=5 NR=1 XO=30 YO=25 GOSUB38
10 X=48 Y=19 XS=-.3 L=20 GOSUB35
11 X=48 Y=19 XS=.5 L=5 GOSUB35
12 X=53 Y=19 XS=-.5 L=5 GOSUB35
13 X=53 Y=19 XS=.3 L=20 GOSUB35
14 FORA=1TO124
15 SYSBS FORT=1TO25 NEXTT,A
16 FORT=1TO1500 NEXTT
17 A$="PCW" FORA=1TOLEN(A$)
18 POKE251,ASC(MID$(A$,A,1))-64 SYSFS FORT=1
   TO150 NEXTT
19 FORT=1TO100 NEXTT,A
20 FORT=1TO500 NEXTT
21 SYSCO,1,1,5 PRINT"█" SYSCO,1,0,0
22 PRINT"█████████DEMO OF BAR ROUTINE"
23 PRINT"████M/C BY GARY 1. FOREMAN IN 1984"
24 FORA=0TO39
25 X=A Y=INT(RND(1)*160)
26 POKE251,Y POKE252,192+X POKE253,7 SYSBA
27 NEXTA FORT=1TO1500 NEXTT
28 INPUT"███WANT TO SEE IT AGAIN ",A$
29 IFLEFT$(A$,1)="Y"THENRUN
30 END
31 FORA=0TO2*π*NRSTEPπ/25
32 X=COS(A)*R+XO Y=SIN(A)*R+YO
33 POKE251,X POKE252,Y SYSSE
34 NEXTA RETURN
35 FORA=1TOL
36 X=X+XS Y=Y+YS POKE251,X POKE252,Y SYSSE
37 NEXTA RETURN
38 FORA=πTO2*π*NRSTEPπ/25
39 X=COS(A)*R+XO Y=SIN(A)*R+YO
40 POKE251,X POKE252,Y SYSSE
41 NEXTA RETURN
```

Arcade Avenue

A plan view

What do you do when you've produced the most sophisticated arcade game ever seen on an 8 bit micro, breaking barriers in terms of graphics and game play?

Release it twice, I suppose. Ultimate, obviously unbowed by the critics who called *Sabre Wulf* a 'repackaged *Atic Atac*', have released *Alien 8* in the almost exact mould of *Knight Lore*, but I'm sure that they are confident that it will be a financial success whatever anyone says.

To be fair you can't expect them to abandon such an innovation, or spend a similar amount of time developing something new, after just one game but it is something of a disappointment that they didn't alter the game play by including something different such as a bit of alien blasting, pursuing monsters, text input, whatever.

Indeed the two game obviously work on such a similar principle that I immediately tried to use the infinite lives poke for *Knight lore, Poke* 53567,0, to see if it would work. However, there is one very apparent difference between the two – the turbo loaders. You need a short routine to get past the turbo loader and get the poke in, which I will be printing for *Knight Lore* very soon, but it doesn't work on *Alien 8*. It's probably worth the first of you who crack the new game trying the above *Poke* straight away.

However, some of the playing tips are applicable to both games, most importantly that you jump further with 'jump' and 'forward' pressed together than just with 'jump', and that when you have collected an object you can drop it, stand on it, and by pressing 'jump' and 'pick-up' together you get a needed boost and keep the thing as well.

My personal feeling is that *Alien 8* is slightly better than *KL*. The graphics seem wittier, particularly the remote controlled robot and the Dalek mice, and the problems seem more subtle somehow. Indeed the movement of the central character is essentially 'robotic' and it's almost as though it was developed for a space age setting, but they were already committed to bringing out three *Sabre Man* games which got first pick.

Whether *Alien 8* is another ten pounds better than *KL* I don't know, but I suppose that if you look at it as 100-odd more screens of puzzles to work out then it is.

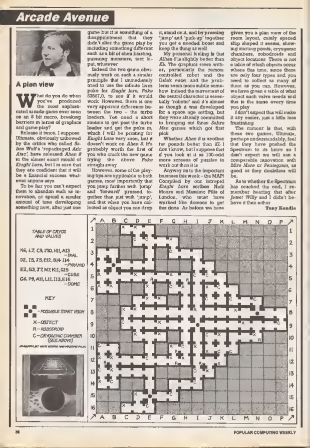
Anyway on to the important business this week – the MAP! Compiled by our intrepid *Knight Lore* scribes Nick Moore and Massimo Pilia of London, who must have worked like demons to get this done. As before we have given you a plan view of the room layout, cutely spaced ship shaped it seems, showing starting points, cryogenic chambers, robodroids and object locations. There is not a table of which objects occur where this time, since there are only four types and you need to collect as many of them as you can. However, we have given a table of what object each valve needs and this is the same every time you play.

I don't expect this will make it any easier, just a little less frustrating.

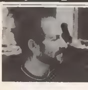
The rumour is that, with these two games, Ultimate, perhaps understandably, feel that they have pushed the Spectrum to its limits so I don't expect we will see a comparable innovation with *Mire Mare* or *Pentagram*, as good as they doubtless will be.

As to whether the Spectrum has reached the end, I remember hearing that after *Jet Set Willy* and I didn't believe it then either.

Tony Kendle



Tony Bridge's Adventure Corner



Help and advice

The major piece of news this week is the opening of a shop devoted to adventurers Any reader of the late much lamented *Micro Adventurer* will be familiar with the name of Ken Matthews, whose witty and perceptive reviews and help did so much to enliven the magazine

He has recently opened a shop in Gravesend called *The Adventurer's Guild* – stocking soft and hardware, it is nevertheless more than just another computer stockist It is run by adventurers for adventurers, and, believe me, what Ken doesn't know about adventures is certainly not worth knowing! The shop also runs a highly efficient mail order service and offers healthy discounts on all its software.

So, those of you who can't get along the the shop (for help and advice on adventures and anything else to do with computers, or even just a cuppa!) can ring Ken, or his equally knowledgeable partner-in-adventuring, John Miles, for help and advice in most adventures *The Adventurers Guild, 26 Harmer Street, Gravesend, Kent, 0474 334006.*

Colditz was released some time ago now, and comes from the Phipps stable – they've been quiet for some while, but have been responsible for some good adventures, including, of course, one of my own favourites, *Knight's Quest*. This one is worth looking at, for the gradual increase in tension and plot complexity

Michael Shaw would like to know what to do with the Bath in the Washroom. As far as I can figure out, Michael, 28 (but I couldn't resist *Take Bath!*) As for the Maze, East of the Sewer Pipe, you 6, 27, 23 Then you'll 20, 13, 34 Incidentally, In the Great Hall, 37, 26, 9, 31, which should open up a bit more of the adventure for you

David Liddle, who, incidentally has sent me a solution to *Valkyrie*, is trying to find the Jewelled Sword to kill the Eagle I don't know if you've been peeking at the listing, David, or just made a mistake, but it is the Jewelled *Spear* you need. David offers help to anyone in *Valkyrie 17, Colditz, Urban Upstart, Pharoah's Tomb, Time Machine* and most of the Artic collection Write to him (with SAE) at 6/1 Hailesand Park, Edinburgh, EH14 2RL.

Speaking of Artic, Garry Mills had encountered a couple of problems in *Golden Apples* To fix the bridge, 21, 7 (you'll need 12, 32, 4, 12, 19, 35, 12, 26, 34, 12, 22) and what to do at the cliff, 38

S Coyne, from the Isle of Wight, is playing *Quo Vadis*, and has come across a couple of riddles Maybe someone can help him to sort them out – here they are. *Tourd Force Using Only A Knife To Eat An A One Solution, Binary Indecisions Between Silent Beginnings And Quiet Terminations*

I can't help you much with these, Mr (Ms?) Coyne, but they look very crossword-like The second one, particularly contains very well-known conventions. 'Silent' is probably pointing at 'h', 'k' or 'p', these letters often being silent at the beginning of a word, while the 'quiet ending' could be hinting at the musical term for quiet, *'Piano'*, abbreviated to 'p' If you have solved the puzzles since you wrote let me know your findings

Now here's a real adventure freak (for which you may substitute, 'loony'!)

"After reading your Adventure Corner, I thought I'd wander down to the local store and get some adventures for my computer, the Amstrad. As you can guess, I didn't find many! However, I came away with *Fantasia Diamond* and *Gems of Stradus*, and now I am well and truly stuck in *Fantasia Diamond* at 4 30 in the morning My problem is that *%£@ Musical Door

"But on the plus side, I'm glad to say that I've completed *Forest at World's End* and *Message from Andromeda*, both from Interceptor and very good indeed. Finally, could you shed some light on another game from Interceptor, *Jewels of Babylon?* I've visited the village and found the match, some fruit and a spear Problem – what do I do now? PS Any help at all in Level 9's *Adventure Quest* would be gratefully received. Anyone needing help in the three adventures I've completed may write, not forgetting the SAE, to Tony Brown, 20 Darant Walk, Bettews Estate, Newport, Gwent NP9 6SN "

Let's see if we can help you, Tony, so that you can at least get some sleep First, *Fantasia Diamond* – to open the Musical Door, you'll have to be carrying 12, 24, 6, 25 35, 10 Now, 3, 36 28, 14, 10, 25 33, 39, 16, 6, 16, 2. This may all be rather difficult to accomplish, what with people running in and out all the time, and you may have trouble getting everything together at the same time Closing the curtain once they're all in may help My thanks to Alan and Daphne Davis for these hints

Adventure Quest – the silver ball is used to 30, 11 (remember Goliath) The onion – 1, 18 The wolves – 17, 12, 23 The sandworm is a tricky little blighter, the key to avoiding it being the fact that any *non*-movement command *(Score, Wait, Inventory* and so on) will cause it to recede So when the sound of slithering sand gets close, just stand still and bide your time You will need the sandworm's help very shortly, however, in getting rid of the Sphinx, so it's a blessing in heavy disguise

Thanks to Hugh Walker, who also pointed out that each of the eight sections of the adventure represents a different element (Air, Fire, Earth and Water – twice each, of course) I really would recommend this adventure to any Amstrad owner who wants a bit of diversion. It's a typically well-planned and absorbing affair and will keep the most discerning of adventurers happy for weeks

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SOFTWARE FOR SALE For Spectrum and Commodore 64 All originals at less than half price Write to M Barker 50 Long Meadow Road Knowsley Merseyside L34 0HS

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KEMPSTON Joystick and Interface plus sixteen tape s/w titles. Worth £130 accept £65 ono Tapes include Hobbit Phoenix Death Chase Mark Chambers 22 Bedford Ave Shaw OL2 7DW or Tel Shaw 881122

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SPECTRUM SOFTWARE for sale Over £180 worth of originals First offer around £85 accepted Will not split. Mr G P Craig 19 Finlow Terrace Fintry Dundee DD4 9NQ

SPECTRUM GAMES Clearout of all my originals Daley's Decathlon Moriarty Mille The Quill Dark Star Full Throttle Pyjamarama, Factory Breakout, Lerm MD 1 Dimension Destructors Tribble Truble Ad Astra Tel 01-669 7083, Richard

FOR SALE for Spectrum (1) Kempston 'E' Interface 2 months old boxed £36 (2) 9" 56 way connector hardly used £5 Tel Hawarden (0244) 537815 after 6pm

SPECTRUM s/w for sale System 1500 Lunar Jetman Half price Tel 061 366 8935

ZX SPECTRUM 48K under guarantee Fuller box with demo case Quickshot joystick + Curser joystick dust cover £100 of s/w £15 of mags Fully boxed O C £145 ono Tel 01-803 1583

SPECTRUM software for sale Blue Max £4 Hampstead £4 Psytron £3 Pyramid £2.50 Beaky £2.50 3D Star Strike £3 3D Tank Duo £3 Mr Bennett 608 Ferndale Rd. Swindon Wilts SW2 1DP

SPECTRUM software for sale Valhalla The Hobbit £6 each all 3 Hungry Horace games only £6 the lot Chess and Backgammon only £6 All originals perfect condition Tel 01-863 3847 5-10pm

SPECTRUM Plus ... Kempston Pro Joystick Interface Kempston 5000 Pro Joystick ... both manuals all new £150 ono Tel Null on 01-886 3052 after ...

SPECTRUM 48k Saga Keyboard interface 1 microdrive 8 cartridges 2X printer sound amplifier £700 of s/w + edoks Sell £225 ono Tel Stafford 822461 after 6pm

48k ISSUE 2, Spectrum light pen Fax programmable joystick interface sound amplifier cassette recorder £60 soft ware + magazines Cost new £280 only £200 (All boxed)

VALHALLA for Spectrum 48k (original) Too difficult for me £10 Call Ruislip 36193 evenings

48K Spectrum excellent condition printer + 4 rolls of paper cassette recorder £700 s/w sell lot for £230. Tel Christchurch (0202) 488727

ZX SPECTRUM 48k s/w Space Shuttle £5 Lunar Jetman £3 Tel Canterbury 451241

ORIGINAL Spectrum games for sale Inc Technician Ted Match Day + Ghostbusters If interested ring **David**, Reading (0734) 661401 between 4-7pm.

EUREKA! New/boxed £9 Tel 01-884 0301 after 8pm Will buy Crimson Adventure (original only)

12 ORIGINAL cassettes for ZX Spectrum inc Forth and 3 books + over 90 mags £50 Will not split. Tel 01-590 8300 after 4pm

SPECTRUM 16k with original s/w as new mead £90 ono Tel 0474 61464 after 4pm

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Wanted

SWAP CBM Plus 4 as new ... DMrnter sell for £200 Offers to Cpl Haynes Supply Sqdn RAF Uxbridge Middx UB10 0RZ Tel 0895 27144 ext 6366 Mon to Fri days time only

WANTED BBC Model B. Tel Mr Taylor 051 638 7567

AMSTRAD CPC464 (Green monitor) wanted! Please write to Jack Teumajian 208 Cardinclifte St Andrews Fife KY16 9AJ

SWAP 48K Spectrum for Male Mbe CB rig complete with power supply antennas etc Send details to Teed 55 Loftus Road London W12

SWOP Office typewriter Imperial 90 mint valued £300 for V20 printer and s/w also Banda 800 duplicator with stationery Both for computer Elvin 214 Horninglow Road Firth Park Sheffield

WANTED Any bits and pieces s/ware h/ware for Vic 20 In fact any item for this unit Write Mr Elvin 214 Horninglow Road Firth Park Sheffield S5 6SG

Commodores for Sale

VIC 20 + Cassette deck 16K expansion + edoks + S/W Cartridges £100 Tel 01-478 1541

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COMMODORE PRINTER boxed only £85 Also floppy disks new unused £1 each Tel Joe 0925 818184

VIC 20 + 3K + C2N recorder joystick games, including Hunchback and Duckshoot Swap for portable colour TV Tel Southport 47262.

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CBM Bridgemaster program 3 cassettes unwanted original gift still boxed cost £25 best offer over £12 Tel Jim 0602 883084 anytime

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CBM64 cassette deck Quickshot 2 joystick books and £140 of original software worth £410 ask for £250 ono Tel Neil m 866692 anytime.

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CBM64 software for sale all original top titles including Hunchback 2, Raid Over Moscow Quo Vadis 27 in all worth £230+ asking price a mere £90 the lot Tel 051 521 5873 anytime

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COMMODORE 64 easy script on disc brand new never used £45 only Also Return to Eden on cassette for CBM64 perfect condition £6 Tel 061 301 4043 anytime

ADVENTURE HELPLINE

Volnor's Lair on Spectrum. How do I get past Volnor? What use is invisibility? M T Baker 22 Elderbek Close Cheshunt Herts

Colditz on Spectrum. Any help wanted Can offer help on Denis Through the Drinking Glass J Pedersen, 18 Charlotte St Folkestone Kent.

Sphinx Adventure on Electron. I can't make any general progress David Bown 16 Park Road, Bear Wheo Warley West Midlands

Urban Upstart on Spectrum. I have a flying suit and a book on flying but nothing to fly Andrew Malinowski, 8 Birch Park Uxbridge Road, Harrow Weald, Middx HA3 6SP

Hampstead on Spectrum. What do I do after buying the cottage for £100 000 (score 85%)? R J Atkins, 1 The Paddocks Potton, Sandy Beds SG18 7QD

Valkyrie 17 on Spectrum. I cannot get the lamb have a shower or open the ski-hut. Robert Mowe 85 Saxham St, Stowupland Stowmarket Suffolk IP14 5DA.

The House of Death on Atmos. How do I beat the mad axeman? How do I open the safe? R Walker 30 Brooklands Drive, Leftwich, Northwich Cheshire CW9 8EN

Forest at Worlds End on CPC 464 How do you cross the chasm? Steven Long 77 Chiltern Gdns, Dawley Telford, Shropshire. 0952 502604

System 15000 on C64. What do you do after entering password at Selcra Securities? Paul Williams 1 Llanfair St Henllan Denbigh Clwyd

Snowball on CPC 464 How do you get through the doors which are too smooth to grip (and any other general hints)? Kevin Jones 32 Derrymore Rd Willerby Hull HU10 6ES.

Eureka! on Spectrum In the Caribbean, how do I get into the plane before it takes off I will help on any other Eureka! adventure in return for info Anne Denham, 4 Kent Close Diggle Oldham Lancs

Voodoo Castle on Vic 20 How do I get the ju ju bag where is the book missing page and doll? Chris Hall 33 Cranes Park Road, Sheldon Birmingham B26 3SE

Sherlock on Spectrum How do you prove Basil killed Tricia? How do you find the gun? How do you open the wall safe safely? Brian Forbes 38 Northgate Quadrant Balornock East, Glasgow G21 3QU

Fantasia Diamond on CPC 464 Exit from cellar stage 80 out of 400 Marua Unsworth 145 Dore Avenue Portchester Fareham, Hants

Heroes of Karn on C64. I have found Beren but I can't find the magic mirror enter the caravan or kill barrowight Kevin Hubbard 330 Booth Road, South Ockendon Essex RM15 6EB

Sorcerer of Claymore Castle on C64. How do you get rid of the moat monster? How do you get into the loft? I have the piece of metal Neil Smith 78 Chester Road Childer Thornton, South Wirral Cheshire

Quest on Spectrum I can never get any money so I never get across the bridge or in any castles A R McDowall 7 Third Avenue Wellingborough Northants NN8 3ND

Dungeon Adventure on BBC How do you get into the troll's room without being seen? How do you catch will o wisp and what use are the bed and the face? Nick Darlow Langleigh Country Hotel, Langleigh Rd Ilfracombe Devon EX34 8EA

Barsak the Dwarf on Spectrum. How do you keep from dying of thirst and how do you light the lamp? Debbie Barbe Vista du Gust Cobo Rd Castel Guernsey Channel Islands

Twin Kingdom Valley on BBC How do you get to the bridge over the canyon? What significance has the short wooden rod? Len Fredricks 8 Nightingale Park Warblington Havant Hants

The Quest for the Holy Grail on Spectrum. 1) How do I get past the Knight of Nic? 2) How do I get rid of my parachute after landing? V Lansdowne 78 Hadrian Road Fenham Newcastle upon Tyne NE4 9QL

Eureka on Spectrum. Adventure 3 How to cure the leprosy? Adventure 3 What tune do I play how do I slay the wolf? (and any other help please) Mark Lambert Mare Farm Grove Oxton Birkenhead L43 9QX

Espionage Island on Spectrum. What two objects do I give the native woman and where do I find them? Jonathan Halifax 17 Fenkirk Road Deeping Gate Nr Peterborough Cambs

Zodiac on Oric I can't get past the wall in the cave and can't do anything down the cellar How do I wash the coal? How do I open the safe and vault? Anthony Jones 129 Parc Road Cwmparc Rhondda, Mid Glamorgan South Wales

Planet of Death on Spectrum. What do you do after you've found the spaceship? Anthony Jones, 129 Parc Road, Cwmparc Rhondda Mid-Glamorgan South Wales.

Eureka on Spectrum. How do you make the uniform and ID card in Colditz? How do you get away with the hollow leg in Prehistoric Times? Ralph Mabbott 66 Rydal Drive Bexleyheath Kent DA7 5EE

COMPUTER SWAP

COMPUTER SWAP

Computer Swap entries are limited to 30 words Either fill in the accompanying form and send to Computer Swap *Popular Computing Weekly* 12 13 Little Newport Street London WC2H 7PP or telephone 01-437 4343

All software offered through computer swap must be in original condition and for private sale only

It cannot be swapped

Warning It is illegal to advertise pirated software

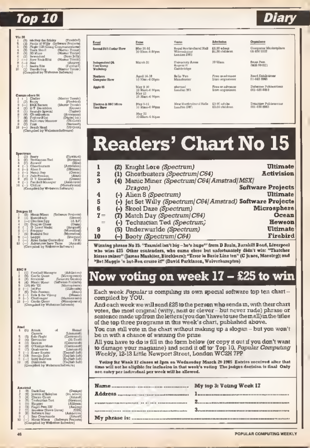
Please write your copy in capital letters on the lines below

Name ....

Address ....

....

Telephone ....



Top 10

Vic 20
1 (5) Mickey the Bricky (Firebird)
2 (3) Perils of Willy (Software Projects)
3 (4) Flight 015 (Comp Communications)
4 (8) Duck Shoot (Mastertronic)
5 (9) 3D Maze (Mastertronic)
6 (2) Bewitched (Bean Jelly)
7 (—) New York Blitz (Mastertronic)
8 (—) Max (Anirog)
9 (—) Snake Bite (Firebird)
10 (1) Doodlebug (Mastertronic)
(Compiled by Websters Software)

Commodore 64
1 ( ) Chiller (Mastertronic)
2 (2) Booty (Firebird)
3 (—) BMX Racers (Mastertronic)
4 (3) D T Decathlon (Ocean)
5 (1) Seaside Special (Taskset)
6 (4) Ghostbusters (Activision)
7 (6) Fighter Pilot (Digital Int.)
8 (9) Raid over Moscow (US Gold)
9 (7) Frak (Statesoft)
10 (—) Beach Head (US Gold)
(Compiled by Websters Software)

Spectrum
1 (1) Booty (Firebird)
2 (6) Technician Ted (Hewson)
3 (7) Airwolf (Elite)
4 (—) Ghostbusters (Activision)
5 (—) Alien 8 (Ultimate)
6 (—) Match Day (Ocean)
7 (—) Pole Position (Atari)
8 (8) D T Decathlon (Ocean)
9 (—) Football Manager (Addictive)
10 (—) Chiller (Mastertronic)
(Compiled by Websters Software)

Dragon 32
1 (2) Manic Miner (Software Projects)
2 (1) Hunchback (Ocean)
3 (—) Chuckie Egg (A & F)
4 (3) Dragon Chess (Oasis)
5 (—) O Level Maths (Ampsoft)
6 (—) Frogger (Microdeal)
7 (4) Buzzard Bait (Microdeal)
8 (—) Leggit (Imagine)
9 (—) Area Radar Controller (Q'A)
10 (—) Adventure Snow Tales (Ampsoft)
(Compiled by Websters Software)

BBC B
1 (1) Football Manager (Addictive)
2 (5) Castle Quest (Micropower)
3 (2) Scrabble (Leisure Genius)
4 (4) Manic Miner (Software Projects)
5 (10) Mr EE (Micropower)
6 (—) Jet Pac (Ultimate)
7 (6) Pole Position (Atari)
8 (—) Eric & the Viking (Mosaic)
9 (—) Challenger (Mastertronic)
10 (—) Castle Quest (Micropower)
(Compiled by Websters Software)

Atari
1 (1) Attack of Mutant Camels (Llamasoft)
2 (3) Solo Flight (Centresoft)
3 (4) Encounter (Hi Tech)
4 (2) Zaxxon (Centresoft)
5 (8) O'Reillys Mine (Centresoft)
6 (7) Gridrunner (Llamasoft)
7 (—) Krazy Kopter (English Soft)
8 (10) Steeple Jack (English Soft)
9 (—) Batty Builders (English Soft)
10 (9) Diamonds (English Soft)
(Compiled by Websters Software)

Amstrad
1 (9) Dark Star (Design)
2 (8) Jewels of Babylon (Int. [illegible])
3 (4) Centre Court (Amsoft)
4 (5) Technician Ted (Hewson)
5 (9) Blagger (Alligata)
6 (3) Flight Path 737 (Anirog)
7 (7) Snooker (Steve Davis) (CDS)
8 (6) Software Star (Addictive)
9 (—) Star Commando (Amsoft)
10 (—) Manic Miner (Software Projects)
(Compiled by Websters Software)

Diary

Event	Dates	Venue	Admission	Organisers
Second Still Radar Show	Mar 30-31 10.00am-6.00pm	Royal Horticultural Hall Westminster London SW1	£1.50 adults £1.00 children	Computer Marketplace 01-930 1612
Independent QL User Group Workshop	March 31	University Arms Regent St Cambridge	10.00am	Sean Pam 0603 864971
Northern Computer Show	April 16-18 10.00am-6.00pm	Belle Vue Manchester	Free in advance from organiser	Reed Exhibitions 01-643 8063
Apple 85	May 9-10 10.00am-6.00pm May 11 10.00am-4.00pm	Olympia London W1	Free in advance from organisers	Database Publications 061-456 8383
Electron & BBC Micro User Show	May 9-11 10.00am-6.00pm May 12 10.00am-4.00pm	New Horticultural Halls London SW1	£3.00 adults £2.00 children	Database Publications 061-456 8383

Readers' Chart No 15

1	(2)	Knight Lore *(Spectrum)*	**Ultimate**
2	(1)	Ghostbusters *(Spectrum/C64)*	**Activision**
3	(4)	Manic Miner *(Spectrum/C64/Amstrad/MSX/Dragon)*	**Software Projects**
4	(-)	Alien 8 *(Spectrum)*	**Ultimate**
5	(-)	Jet Set Willy *(Spectrum/C64/Amstrad)*	**Software Projects**
6	(-)	Skool Daze *(Spectrum)*	**Microsphere**
7=	(7)	Match Day *(Spectrum/C64)*	**Ocean**
=	(-)	Technician Ted *(Spectrum)*	**Hewson**
9	(5)	Underwurlde *(Spectrum)*	**Ultimate**
10	(–)	Booty *(Spectrum/C64)*	**Firebird**

Winning phrase No 15. "Tramiel isn't big – he's huge" from D Brain, Barnhill Road, Liverpool who wins £25. Other contenders, who came close but unfortunately didn't win: "Thatcher kisses miner" (James Mashiter, Blackburn); "Error in Basic Line ten" (C Jones, Maesteg); and "Bet Maggie 'n hot-Ron cruise it!" (David Parkinson, Wolverhampton)

Now voting on week 17 – £25 to win

Each week *Popular* is compiling its own special software top ten chart – compiled by YOU.

And each week we will send £25 to the person who sends in, with their chart votes, the most original (witty, neat or clever – but never rude) phrase or sentence made up from the letters (you don't have to use them all) in the titles of the top three programs in this week's chart, published above.

You can still vote in the chart without making up a slogan – but you won't be in with a chance of winning the prize

All you have to do is fill in the form below (or copy it out if you don't want to damage your magazine) and send it off to: Top 10, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP

Voting for Week 17 closes at 2pm on Wednesday March 20 1985. Entries received after that time will not be eligible for inclusion in that week's voting. The judges decision is final. Only one entry per individual per week will be allowed.

Name .... **My top 3: Voting Week 17**
Address .... 1..
.... 2..
.... 3..
My phrase is: ....

New Releases

MINDSHADOW

Activision has recently launched two new adventures for the Commodore on disc. both are graphically illustrated text adventures with sophisticated language analysis, and both cost £19 99 Of the two games, *Mindshadow* and *The Tracer Sanction*, I chose the former to have a look at.

Mindshadow begins with your awakening on a desert island with no memory and no past – find out who you are and what you're doing there as you try the adventure The first thing that is apparent is that this is a very professionally (and amusingly) produced product. On the disc there is a well-constructed training mode that takes you through some of the basic ideas of adventuring, illustrating some typical problems and showing you how to find clues to the answers

The next noteworthy point is that the graphics are excellent, well-designed with much use of shading and airbrush-like effects Another nice feature – a special quicksave specifically designed for those 'will I? won't I? moment when you know that doing something is either going to kill you or crack a difficult problem. You simply do a quicksave and try out your idea -- if not, you load back the last position in seconds.

The adventure is devious and large with around 50 possible trails in the first three locations In short, the whole thing is an excellent professionally produced product and why do I always have to end Activision reviews with the following: it's too expensive

Program *Mindshadow*
Price *£19 95*
Micro *Commodore 64*
Supplier *Activision*
15 Harley House
Marylebone Rd
London NW1

AMSTRAD HOBBIT

There's not much that can be said about *The Hobbit* that won't have already been said a thousand times It is a superb adventure that is a perfect blend of atmosphere, sophistication, graphics and classic adventure problems that has been surpassed by little in the nearly three years since it was first released.

Over the past few months, versions have been released for the MSX machines and now the Amstrad The Interceptor games have shown just how stunning Amstrad graphics can be with ultra high detail in superb resolution on the monitor

It has to be said that *The Hobbit* on the Amstrad has nothing like as good graphics as it could have – instead, you get roughly what the Spectrum had three years ago I think that's a shame and it reflects a certain lack of effort – the Amstrad Hobbit could have been the best

Nevertheless, if you have an Amstrad and want to know what all the fuss was about, buy it.

Program *The Hobbit*
Price *£14 95*
Micro *Amstrad CPC464*
Supplier *Melbourne House*
Castle Yard House
Castle Yard
Richmond

BAND ON THE RUN

Give my Regards to Broad Street was a film about which many people had unkind things to say while a good section of the general public clearly enjoyed it I didn't see it. The program of the film is now available released for the Spectrum and Commodore by Argus Press

Movie spin-offs have frequently been dire and I held out little hope for this one – it seemed to smack of plenty of big bucks to buy the rights and nothing to back it up with programming skills and inventiveness But no.

Give my Regards to Broad Street is actually a very good game and it's fairly well programmed – it has more original ideas than anyone could reasonably have expected. The main section of the game consists of a scrolling map of London (simplified somewhat) around which you (playing Paul McCartney) must drive trying to meet up with other characters from the film.

It's partly a matter of driving the car, but mainly a question of reasoning from the potted histories in the leaflet what character is going where – the screen tells you what tube station the character has entered and the time of day you have to get to the tube you think they'll exit from before they do If you manage to get to the right station before the character does, you get out of the car and the scene changes to a picture of the tube entrance with you looking quite a lot like PM strolling back and forth.

Meet the character and you get a part of the tune of the title – get the entire tune and you have to take it to Abbey Road to be mixed, another puzzle

It's frenetic and frustrating as you zoom around the city looking for the tube and arriving (usually) too late or at the wrong tube In other words it's pretty addictive

Curiously, the worst aspect of the game is the music which is (mostly) *Band on the Run* – the likes of the

This Week

Program	Type	Micro	Price	Supplier
Angelique	Ad	Amstrad CPC464	£9 90	Nemesis
Brawn Freel	Ad	Amstrad CPC464	£2.90	Nemesis
The Hobbit	Adv	Amstrad CPC464	£14 95	Melbourne House
Flight Simulation	Arc	Amstrad CPC464	£11 99	Myrddin Software
Jammin'	Arc	Amstrad CPC464	£8 90	Taskset
Caveman Capers	Arc	BBC B	£7 99	Icon Software
Mindshadow	Ad	Commodore 64	£19.99	Activision
The Tracer Sanction	Ad	Commodore 64	£19 99	Activision
Tir Na Nog	Ad	Commodore 64	£9.95	Gargoyle Games
Ice Palace	Ad	Commodore 64	£7.95	Creative Sparks
Mama Llama	Arc	Commodore 64	£7.50	Llamasoft
Pole Position	Arc	Commodore 64	£9.95	US Gold
Regards to Broad St	Arc	Commodore 64	£7.95	Argus Press
Super Huey	Arc	Commodore 64	£9.95	US Gold
C64 Forth +	Ut	Commodore 64	£14.95	Melbourne House

New Releases

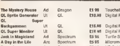
Ghostbusters music has led one to expect a lot from the Commodore and the music on the game is, well, lame It plods along with no sense of dynamics and detracts from the game Apart from that, a good game

Program *Give my Regards to Broad Street*
Price *£7 95*
Micro *Commodore (also Spectrum)*
Supplier *Argus Press Software*
Liberty House
222 Regent Street
London W1R 7DB

LLAMA MIA

There comes a time where every reviewer has to own up – after reading through the many lines explaining the plot of *Mama Llama* several times, I am still baffled This is what I've got so far the plot, incomprehensible, involves simulated video games on a planet called Led-Zepp 1V (was that the one with *Stairway to Heaven* on it?) first part of game is a grid in which you choose what planet and how many aliens you want to fight. Part two sends you to the planet where you defend





your Llama offspring from attack from various kinds of alien, one of which looks like a buffalo

However there are things called Antigenesis devices and Retrogenesis devices, which seem to be the Minter equivalents of smart bombs in that they reduce the number aliens in certain ways There appears to be all kinds of strategic elements to the way the game is played and it zaps like crazy Beyond this, I don't dare to comment

Program *Mama Llama*
Price *£7 95*
Micro *Commodore 64*
Supplier *Llamasoft Software*
49 Mount Pleasant
Tadley
Hants

JAMMIN

One of the most underrated game ever for the Commodore 64 was the wonderful *Jammin* from Taskset It has now converted it for the Amstrad which, although equipped with a marginally less powerful sound chip, does have the virtue of being able to have sound routed through your hi-fi.

The game revolves totally around music and is essentially very simple – travel round the screen dodging bum notes and collecting instruments Each screen is a different maze based on the idea of colours There are variously coloured moving platforms – you may get on to one only of the same colour but leave on to any colour, so you have to think about the way through each maze

All the above is only really your standard arcade stuff. However, it is lifted by a brilliant soundtrack, a sort of infectious jazz riff that begins as a lurching rhythmic pulse and is added to as you collect each instrument – the baddie bum notes add discords if they get you. In this way the music reflects the whole game and makes it utterly addictive

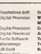
Program *Jammin*
Price *£7 95*
Micro *Amstrad CPC464*
Supplier *Taskset*
Freepost
Bridlington
YO16 4PR

Pick of the week

THE HERO IS BACK

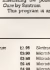
Tir Na Nog was one of the most impressive original games of last year, marvellous graphics and animation, complex plot and a range of ways of playing it made it one of the top five Spectrum games of 84

Now it has been converted to the 64 so exactly you'd think you were looking at the same game Some small sound effects have been added, but Gargoyle, probably rightly, have decided that continuous music would have









detracted from the game

The plot is based on authentic Celtic myth and the stories of Cuchulainn the Hero in particular The task is to locate and re-unite the fragments of the Seal of Calum This proves to be a complex task since some of them are in the keeping of other characters in the game There are plots within plots and tasks within tasks, and the various objects to be found in the Other World may have many or no uses It all happens graphically as you move Cuchulainn around the world, hair waving in the wind (wait till you see the animation).

If you want a state of the art graphics adventure on the Commodore, look no further and await with baited breath the sequel, *Dun Darach*, due soon on the Spectrum.

Program *Tir Na Nog*
Price *£9 95*
Micro *Commodore 64*
Supplier *Gargoyle Games*
74 King Street
West Midlands
DY2 8QB

CAR CURE

Leaving aside the question of whether the Spectrum actually gets better programs than other machines, one thing is certainly true, the range of products is certainly wider Only on the Spectrum would you get *Acupuncture Stress Points* or *Know your Rabbits IQ* – less esoteric but still illustrating the point is *Car Cure* by Simtrom

This program is an expert

This Week

The Mystery House	Ad	Dragon	£1 99	Touchstone Soft
QL Sprite Generator	Ut	QL	£10.95	Digital Precision
QL Super Backgammon	Ut	QL	£15.95	Digital Precision
QL Super Monitor	Ut	QL	£18 95	Digital Precision
Jack in Magicland	Ad	Spectrum	£5 95	Turtle Software
A Day in the Life	Arc	Spectrum	£5 95	Micromega
Bruce Lee	Arc	Spectrum	£7 95	US Gold
Thermonuclear	Arc	Spectrum	£5 95	Zircon Software
Spectrum M/C System	Ed	Spectrum	£7 95	Roybot
Car Cure	Ut	Spectrum	£7 95	Simtron
Williamsburg Adv	Adv	C16	£2.90	Microdeal
Mansion Adventure	Adv	C16	£3 90	Microdeal
Cuthbert in Space	Arc	C16	£6 95	Microdeal
Arena 3000	Arc	C16	£4 90	Microdeal
Tombs of Doom	Arc	C16	£6 95	Microdeal
Twin Kingdom Valley	Adv	C16	£6.90	Bug-Byte

Key Ad – adventure S – strategy-simulation
Arc – arcade Ut – Utility
Ed – education

system (well since this is the Spectrum 48K, let's call it a fairly knowledgeable system) which helps you diagnose faults on your car Basically, you tell it what you know about the problem and it leads you through further questions until you reach an inevitable conclusions about the cause – it'll then tell you what level of skill you'll need to correct, often offering the helpful (if optimistic) advice that "you can do it"

There are two approaches you can take to your problem – the part or the symptom. That is you can follow an investigative line by beginning with, say, brakes or by 'car won't start'. Further questions eliminate possibilities and, theoretically give you your answer

The database of information is fairly full (900 faults and 300 symptoms) and incredibly easy to use (it all works by menu choices with a cursor) Inevitably it isn't going to contain everything that could occur but it's certainly not bad £9 95 is probably a bit expensive Potentially useful though.

Program *Car Cure*
Price *£9.95*
Micro *Spectrum*
Supplier *Sintron*
4 Clarence Drive
East Grinstead
West Sussex
RH19 4RZ

CLIVE'S AHEAD

The latest release from Micromega poses some problems Although it has several nice features, I found it technically uninspired and a joke which, funny for a minute or two, soon wears thin and leaves you with a very ordinary collect and dodge game However, I should add that other think it's wonderful, but then they think the joke is funnier than I do.

A Day in the Life is a narrative tale – the story of an average day in the average life of animated sprite head which looks not unlike Sir Clive. The sequential aspect of the game is one if its good points the way the tale continues from screen to screen links them together and makes for a more complete seeming game, *eg*, the train you have to catch on one screen brings you into the platform in another episode and so on.

Each screen consists of sprites you have to dodge and objects you have to collect Its timing is in the *Manic Miner* style, but it lacks the precision and could do with a graphic designer working on some of the screens Certainly not bad, but don't buy it for the joke and don't expect anything technically staggering.

Program *A Day in the Life*
Price *£5.95*
Micro *Spectrum*
Supplier *Micromega*
230-236 Lavender
Hill
London SW11 1LE

CRESTA RUN

Moon Cresta is Incentive's purist version of the venerable arcade classic *Moon Cresta*. The reason for this unlikely similarity of titles is that Incentive have licensed the game officially (ie, they paid money) and so do not have to call it Galactic Swoop or Bird Attack or Firebirds from Hell or similar

Moon Cresta, the arcade game, represented the state of the art around five years ago and consisted of basic blam, blam, blam, dodge as aliens swooped towards you, formed into patterns, swooped again and you blasted them as best you could, level after level These days it looks a bit simplistic but something about the pace of the game makes it extremely addictive

The Incentive *Moon Cresta* is a near perfect recreation of the original which is quite an achievement on the Spectrum – not a colour clash problem in sight Everything is right, the design of the shapes, the pace of the game, the difficulty of the levels and, most surprisingly of all, the sound which mimics the blurps and wooshes of the original, using the Spectrum bleep It's a zap game of the highest order

Program *Moon Cresta*
Price *£6 95*
Micro *Spectrum*
Supplier *Incentive Software*
54 London Street
Reading RG1 4SQ

NO HEADING

Creative Sparks latest offering for the Commodore 64, *Ice Palace*, is set in a kingdom which is forever in winter You must collect the seven pieces of the Ice Crown which are hidden throughout the evil Ice Queen's Palace If you succeed, you will break the spell of eternal darkness and turn winter into summer

It sounds like a cross between C S Lewis's *The Lion, the Witch* and the *Wardrobe* and John Christopher's *World in Winter* However, it is just the setting for another adventure – an arcade game with adventure overtones – in almost Ultimate style.

You have to manoeuvre through a series of hexagonal rooms, aligning the doorway of one room with the door of another You must also avoid the Queen's servants who will do their best to knock you off in double quick time

A complicated game at first, but worth the trouble in getting to know it better Seven levels of play

Program *Ice Palace*
Price *£6 95*
Micro *Commodore 64*
Supplier *Creative Sparks*
Thomson House
296 Farnborough
Road
Farnborough
Hants

This Week

Activision, 15 Harley House, Marylebone Road, London NW1 01-486 7588 **Alligata** 1 Orange Street, Sheffield S1 4DW 0742 755796 **Amsoft** Brentwood House, 169 Kings Road Brentwood Essex 0277 230222 **Argus Press** Liberty House, 222 Regent St London W1R 7DB 01-439 0666 **Bug-Byte** Mulberry House Canning Place, Liverpool 051 709 7071 **Creative Sparks** Thompson House 296 Farnborough Rd Farnborough Hants 0252 543333 **Digital Precision** 91 Manor Rd Higham London E17 5RY 01-527 5493 **Gargoyle Games** 74 King Street Dudley West Midlands Dudley 238777 **Icon Software** 65 High Street Gosforth Tyne & Wear **Llamasoft** 49 Mount Pleasant, Tadley Hants 07356 4478 **Melbourne House** 39 Milton Trading Estate Abingdon, Oxon OX14 4TD 0235 835001 **Microdeal** 41 Truro Road St Austell, Cornwall 0726 73456 **Micromega** 230-236 Lavender Hill, London SW11 1LE 01-223 7672 **Myrddin Software** PO Box 61 Swindon SN5 8BG 0793 40661 **Nemesis** 10 Carlow Road Ringstead, Kettering, Northants NN14 4DW **Roybot** 45 Hullbridge Rd Rayleigh Essex SS6 9NL 0268 771663 **Simtron**, 4 Clarence Drive, East Grinstead West Sussex RH19 4RZ **US Gold**, Unit 10 The Parkway Ind Centre Heneage Street Birmingham B7 4LY 021 359 3020 **Zircon Software** 2 Wendling Rd Sutton, Surrey 01-641 7102



A brick wall

Like many others, I recently decided that it was time for me to get into computing. Although I have owned a jolly good programmable calculator (TI 59) for many years, I still felt that I was computer naive.

Further ammunition required to purchase one was provided by my eight year old son who felt I should rub shoulders with the new technology.

The hard part was to decide which computer to buy. The proliferation of good machines makes the choice extremely difficult.

I think that it is true to say that we would all be very happy if there was just one micro to buy, whichever it happened to be. On top of that, we would benefit by having just one big fat and cheap magazine to buy, one basic dialect to learn, MSXing all of the software, etc. etc.

My great fear is that the big three machines, Spectrum, BBC and Commodore will hold back technology by the virtue of their great asset which is their old age. That sounds like a contradiction, until you equate age with software base.

I finally bought the Amstrad two months ago, after studying a great number of magazines and test reports, on the basis of the information that it was a good all round performer at a competitive price. However, I still suffer from the nagging doubt of software support. I can't ever see it being as well supported as the Spectrum.

As time passes, the Amstrad does seem to be selling well, which bodes well for the future. But what of the many other excellent 'new' computers eg Memotech, Enterprise, etc? It's going to be hopeless with all these machines, each supported by relatively small groups – too small to interest the software houses.

It is interesting that there are numerous other cases of software holding back technological advance, with good reason too, I'm starting to believe.

Videos. Betamax is technically better than VHS, and is said to produce a better picture and is cheaper into the bargain. But VHS was first in, and has the 'software' support.

Record players. LP's and tapes (musical software) are vastly inferior to the best compact discs – but look at the software base against which it has to fight! At least the manufacturers agreed groove dimensions, speed, etc, otherwise they would be in the same mess as the computer business.

Languages. This is the biggest 'software' immovable, software restricted area. The English language could be regarded as Basic with many dialects, American, South African, Australian and so on. Forth is French, 'C' is German, Pascal is Greek . . . ad nauseam.

Esperanto is Basicode or MSX had it been unsuccessful, tragically. Imagine – with Esperanto, the entire population of the world would only have to learn two languages, mother tongue plus Esperanto, in order to communicate with everyone on the whole planet.

Isn't that logical? It's so obvious, it has to work . . . but of course, it doesn't.

Languages have to be the biggest mega-brick wall in history. We are lucky speaking English, which is a good Basic – Imagine being stuck with Icelandic.

MSX is a good effort at producing a computer Esperanto, but is on too small a front, being initiated in one country.

Doesn't Basicode provide the answer? All we need then is a different loader program for our different machines. Alternatively, let's all write in machine-code, then at least all Z80 machines will be roughly compatible. Something must be done soon.

Assume that another five brilliant machines are launched in 1986. Dare anyone buy them? Won't they all end up in fragmented groups which are impossible to support? And should I have bought a Spectrum/Commodore 64/BBC?

Frank Marshall

Out for a duck

Puzzle No 149

When Lower Deddlerswell play Flitchbury at cricket, it is an event supported enthusiastically by both villages, and gives rise to much debate for many months afterwards. Indeed, last year's match is still hotly discussed in the Cobblers Arms, although many of the facts have now become distorted through time and an alcoholic haze!

For example, no one can agree on who scored what for Flitchbury in the last match, nor how many players were out for a duck.

What is certain is that they were all out for a total of 100 runs, and that, of those players who scored, their individual totals were either 15, 17, 23, 34, 36 or 40 runs.

In other words, a player, who made runs, achieved one of these totals and no other, although it is not certain that any one of these given totals was necessarily a total that was actually scored.

Can you discover how many of the team scored runs, and what their individual scores were.

Solution to Puzzle No 144

Each shirt cost Sammy £3 11, so his profit on each was £4 88 or £351 36 on all six-dozen.

```
10 FOR A=1 TO 9
20 FOR B=0 TO 9
30 LET T=A*10000+6790+B
40 LET N=72
50 LET P=T/N:P=VAL(STR$(P))
60 IF P=INT(P) THEN PRINT N,T
70 NEXT B
80 NEXT A
```

Reducing all values to pence, we need to find the value of *N*, such that *N* * 72 gives a five-digit answer, the middle three digits being '679'; the program works by substituting the two missing digits by means of the two *For/Next* loops, and checking to see if the figure divided by 72 will give an integral answer. Any value so found will represent the cost price of one shirt.

Winner of Puzzle 144

The winner is J P Martin of Maidenhead, Berks, who receives £10

The Hackers

And this is our keenest priced system!

It's got...

By the way, about this printer paper...

Why does each sheet say:- "NOW WASH YOUR HANDS PLEASE"

BINK'S COMPUTER EMPORIUM

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